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THE JOURNAL OF
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INTELLIGENCE RATINGS BY GROUP SCALES AND BY THE STANFORD REVISION OF THE BINET TESTS

G. M. RUCH

AND

LEXIE STRACHAN

University of Oregon

The results reported here were obtained by the use of two groups scales for the measurement of general intelligence, *viz.*, the Army "Alpha" and the newer "Chicago" scale of Freeman and Rugg. The individual tests were made with the Stanford Revision of the Binet-Simon scale. The number of subjects used totalled about one hundred and twenty although only 116 took all three tests. The results for ten additional subjects in advanced grades are not included since the chronological ages of this small group were so near to the upper limit of the Binet as to render the mental age scores relatively too low and would therefore operate to lessen the reliability of measures of correlation. It was originally the intention to include other group scales but this idea was finally given up because of the large danger of introducing marked practice effects owing to the fact that most of the group scales in existence today are quite closely patterned after the Otis and Army scales. It is believed that the practice factor has been largely overcome in the use of the two group tests here reported by the plan used of giving half of the subjects the Alpha test first and to the remainder the Chicago scale first. Part of the individual examinations immediately preceded the group tests and part were subsequent by a few days in point of time. The individual tests were all given by the writers together with the assistance of Mr. G. E. Finnerty and Professor B. W. DeBusk, both of this University. The group tests were given by one of the writers (Ruch) and

the exact procedure of the "Examiner's Guide" and that of Freeman and Rugg was followed in giving the respective tests.

The pupils taking part in the tests comprise all of the junior division, *i.e.*, seventh, eighth and ninth grades, of the University of Oregon High School. For the reason given above, the older pupils were not included. Although the number of subjects used is comparatively small, nevertheless, it is believed that the fact that the same subjects were used in all the tests gives the results greater reliability than the size alone of the number might indicate.

A few statements about the nature of the Chicago Group Intelligence Test may serve to throw light on the comparisons given below since the test is of quite recent origin. As far as the writers are aware, the Chicago test is frankly an attempt to revise the Army Alpha in such a way as to increase its usefulness with school children. The changes as we view them are in brief:

1. The shortening of the time needed for giving the tests from about 40 or 45 minutes to about 20 to 30 minutes.

2. The elimination of four of the tests of the Army scale, *viz.*, No. 1, "Directions Test;" No. 2, "Arithmetical Problems;" No. 5, "Disarranged Sentences;" and No. 8, "Information" test.

3. Changes in the mechanical make-up and in the matter included and eliminated in the four tests common to both scales, *e.g.*, "Number Completion," "Opposites," "Analogies" and "Best Reasons." In the case of the first mentioned, the changes are considerable and probably introduce very different psychological factors. That this last is also true of the other changes is, of course, just as possible although mere inspection would seem to indicate that the changes here take on more of the nature of mechanical rearrangement.

4. The addition of a "Proverbs" test not included in the Army scale.

5. Revision of the directions given to the subjects before each test resulting in a very marked shortening of the spoken directions in some cases. In some cases this involves the elimination of part or all of the examples worked out together by examiner and subjects before the test is actually begun.

6. The elimination of military terminology and demands upon knowledge ordinarily not possessed by civilians.

Of the changes listed above, the one of greatest advantage in actual school practice, perhaps, is the shortening of the time needed to give the tests. School administrators are much more likely to

make extended use of the idea of intelligence testing if too much time is not required. At the same time a high degree of reliability must be maintained. This latter involves a number of important considerations, many of which have never been seriously studied, and a few of which can be mentioned here in passing: first, the question of short time versus long period testing, the reliability of the test as a whole as shown by the correlation coefficients with individual tests, teachers estimates, re-testings, errors introduced by the giving of such tests by untrained examiners, differences in conditions under which the testing is done, and a host of others. To mention a single concrete factor, it has been shown that under favorable circumstances the reliability of estimates of intelligence can be made to show correlations as high as from .40 to perhaps .75 with the results of the most accurate individual test results. Needless to say that this method requires especially careful judgments and by virtue of this fact remains the exception rather than the rule, but, at the same time, this method does set a certain rough standard of reliability which any group test must meet in order to be justified in its widespread use in the schools. After making the due allowance for error attending the use of a group test under the widely varying conditions obtaining throughout the schools taken as a whole, there must exist a fairly high degree of reliability in comparison with the best available methods of rating general intelligence,

Some of these points will be referred to again in the discussion of the correlation coefficients actually found in this study.

In making the correlations reported here, it was thought that, everything considered, the most reliable measure of intelligence was that of the mental age as determined by the individual Binet examinations. All of the coefficients are obtained from this basis. Likewise the reliability of the separate tests was measured against the mental age findings. Table I shows the Pearson coefficients for the two group scales in relation to the Stanford Binet.

TABLE I

Showing the Pearson coefficients for correlation between the mental ages as obtained by the Stanford Revision of the Binet-Simon tests and

Army Group Examination Alpha	0.728 ±033
Chicago Group Intelligence Test	0.622 ±038

In table II, we have computed the coefficients of the five separate tests of the Chicago scale with mental ages, and in the cases of four of

these tests which are common to both group scales the coefficients for the corresponding alpha tests are given for comparison. The numbers in parenthesis refer to the numbering of the tests in the separate scales. It must be remembered here that the tests compared, *e.g.*, the "Opposites" of the scales are not exact equivalents in the two scales; and that in some cases, the amount of revision is very great and is undoubtably accompanied by considerable differences in the exact psychological natures of the pairs of tests compared here.

TABLE II

Showing the Pearson coefficients of correlation between the mental ages as obtained by the Stanford Revision of the Binet-Simon tests and the separate tests common to both group scales.

Name of test	Coefficients of correlation	
	Chicago	Army Alpha
"Opposites"	(1) 0.372 ± .053	(4) 0.596 ± .042
"Number Completion"	(2) 0.368 ± .054	(6) 0.418 ± .052
"Proverbs"	(3) 0.479 ± .048	
"Analogies"	(4) 0.475 ± .048	(7) 0.460 ± .050
"Best Reasons"	(5) 0.400 ± .052	(3) 0.456 ± .050
No. taking test	118	116

It will be noticed by referring to Table I that the reliability of the army Alpha test is somewhat greater than that of the newer Chicago scale, the coefficients being, respectively, .73 and .62. This comparison is not necessarily to be interpreted as wholly unfavorable to the use of the Chicago tests since there is an important consideration involved in the question of the time factor in giving the tests. It requires approximately half as long to give the Chicago test. It is therefore entirely to be expected that the correlation of a brief scale will show a smaller coefficient of correlation than would a long-period test, all other things being equal. If economy of time is the most important factor in the practical use of intelligence tests, then, the brief scale has its advantages. If, on the other hand, accuracy is the prime desideratum, it is likely that the future will demand scales which occupy more, not less, time than present tests. Dr. E. L. Thorndike[1] has

[1] Thorndike, E. L.: Tests of Intelligence; Reliability, Significance, Susceptibility to Special Training and Adaptation to the General Nature of the Task. *School and Society*, 9, 1919, 189–195.

quite recently expressed his opinion on this question of the necessary amount of time for an entirely satisfactory degree of reliability to this effect. He would use a "fore-exercise" amounting to about 30 minutes for the purposes of equalizing previous training and insuring the proper kind of comprehension of the task to be done. The real test would then occupy about 200 minutes (on two or more days). Under these conditions the size of the P.E. can be reduced to a reliable value. The exact import of his contention is quite clearly stated when he says: "A correlation of .80, between general intelligence in a three hour test is probably as high as a competent person would hope to attain. If we placed persons in the first tenth, second tenth, third tenth, etc., of men on the basis of a correlation of .80, we should be wrong 73 times out of a hundred."

Table II shows that in three of the four tests common to both scales the individual tests of the army scale shows rather higher correlations than the separate Chicago tests with the Binet ratings. In the "analogies" test, the Chicago test is slightly superior. The most striking difference is in the "Opposites," where the coefficients are .60 and .37 respectively for the Alpha and Chicago. Such differences, notwithstanding the fact that our number of cases is small, would seem to indicate that there are significant changes involved in the reorganizations that Freeman and Rugg have made. The more mechanical changes in the form of the tests can hardly account for this degree of difference.

If the number of cases in this study had been distinctly larger, the attempt might have been made to advance some specific criticisms of the separate tests. Since the data is not at all adequate for this purpose, we shall only suggest a possible explanation for some of the relatively low correlations in certain of the separate tests of the Chicago scale which was thrust upon us in the course of actually giving the tests, *viz.*, the fact that a very considerable number of pupils of relatively high grade ability failed to comprehend the signifiance of the oral and printed directions as examiner and subjects read them together and because of this fact made poor scores. That a certain number should fail to comprehend directions is to be expected although these would in most cases tend to be pupils of relatively low grade ability. In the case of test 3, "Proverbs" of the Freeman-Rugg test, there were 24 zero scores in 118 test papers, or about 20 per cent. That the same tended to hold true in other cases is shown by the distribution reproduced here for test 2, "Number Completion" in the Chicago scale.

In this case the number of failures is smaller, but thirty others make only one correct solution (weighted score of 2) thus establishing the empirical mode at 2.0, although the mean and median are, respectively, 5.7 and 6.0.

TABLE III

Correlation Table for Chicago Test 3, "Number Completion" with Stanford Binet Mental Ages.

Score in Chicago, Test 3,—"Number Completion."	Mental Age—Stanford Binet											
		Below 10 years	10–0 to 10–11	11–0 to 11–11	12–0 to 12–11	13–0 to 13–11	14–0 to 14–11	15–0 to 15–11	16–0 to 16–11	17–0 to 17–11	18–0 to 18–11	*f*
	14	..	..	..	..	..	1	2	..	1	..	4
	12	..	..	..	..	1	2	..	1	2	1	7
	10	..	..	..	2	..	4	2	5	1	2	16
	8	..	..	1	1	..	3	..	4	2	..	11
	6	..	1	1	..	3	4	5	2	5	1	22
	4	..	..	3	2	5	5	4	3	..	..	22
	2	1	2	1	2	4	10	5	3	1	1	30
	0	..	1	..	1	4	..	..	..	..	..	6
	f	1	4	6	8	17	29	18	18	12	5	118

Analyzing the foregoing table a little further it might be shown that a score of 2.0 is virtually of little significance as a measure of any real accomplishment in the number completion test since the first test series is almost identical with one explained in the directions, thus:

1 2 3 4 5 .. 7 8 9 .. 11 12 13 (Form B)

is identical with the series explained in the course of the oral directions save that there the missing numbers are 10 and 13. It would seem that if a pupil has comprehended the import of the directions at all that he should have little difficulty in passing the first series, thus scoring 2.0, and that the score would represent but little real achievement. In this particular instance there was some definite evidence of misunderstanding of the oral directions as a number of pupils spontaneously informed the examiner of the fact. As still further

light on this point is the fact that examination of the test blanks showed that, in the large majority of cases, the pupils who failed of substantial scores in the test had attempted to fill in every series by adding one to the preceding number. Each of these points were not true of the Alpha, or if true, to a minor extent.

On the other hand, by mere inspection of the two number completion tests as they occur in the two scales, the writers both share the feeling that the Chicago test is superior to the corresponding one of the army scale because of a more uniform progression in difficulty. This should result in greater diagnostic and differential value. It should be noted that the time limit in this case is the same as for the corresponding Alpha test, *i.e.*, 3 minutes. The number of test series is smaller but are finally more difficult.

If our data were more adequate in point of quantity, the attempt might be made to explain away this irregularity in the correspondences of the three intelligence tests under consideration. However, we shall merely advance the suggestions that, if our findings should be duplicated with further use of the Chicago tests, that it might be interesting to learn the effect of amplifying the oral and written directions to the tests so as to cover more types of examples, *e.g.*, in the "Proverbs," explain by an example each of the three relations to be marked "S," "O" and "N," respectively (*i.e.*, same meaning, opposite meaning, no relation). The position is suggested as valid that initial comprehension of the task to be done should not be allowed to influence too greatly the score in comparison with the actual degree of success in the performance of the task, once it is comprehended. A fairly close approximation to a normal distribution should be one criterion of a good test provided the correlation is moderately high between the test and other standard measures of general intelligence. A tendency for the scores to group about some low value might, then, be taken as indicative of low comprehension value for the test directions. At any rate in the case under discussion, we do find a fairly uniform distribution of mental age scores (considering the magnitude of N) along with rather badly skewed distributions in some of the separate tests of the Chicago scale.

For the sake of comparison the various distributions referred to in the foregoing are reproduced. It will be noted that the irregularities in the distributions of the separate tests of the Chicago scale do not appear in the distribution of the total score for the scale and hence the suggested criticisms above do not apply.

One final point should be raised as a possible answer to some of the irregularities in our findings, *viz.*, that the group tested is not a typical sampling of children of the ages represented. This is admitted. The pupils of the University High School at Eugene represent beyond doubt a composite group. This is shown in tables V and VIII where the mental age and distributions are compared with the results obtained by other investigators. What effect the fact of a composite group might have as causes of the irregularities mentioned above, we are forced to leave as conjectural. It would seem that the identity of subjects used in all three tests would remove this as a casual factor in the skewness of certain of the curves of distribution.

TABLE IV

The distribution of mental and chronological ages of the 121 pupils represented in the three junior high school grades of the University High School, Eugene, Oregon.

Age	9	10	11	12	13	14	15	16	17	18	19	20
C. A.	0	0	4	24	37	24	18	7	5	0	1	1
M. A.	1	4	6	8	19	30	18	18	12	5	0	0

TABLE V

The distribution of the scores in army Alpha for 116 pupils of the three junior high school grades of the University High School, Eugene, Oregon.

0–19	20–39	40–59	60–79	80–99	100–119	120–139	140–159
1	2	13	27	29	24	15	5

TABLE VI

The distribution of the scores in the Chicago test for 118 pupils of the three junior high school grades of the University High School, Eugene, Oregon.

0–9	10–19	20–29	30–39	40–49	50–59	60–69	70–79
1	12	22	31	27	12	11	2

TABLE VII

Median scores in the several tests. Number of pupils varying from 116 to 120.

C.A.	M.A.	I.Q.	Alpha	Chicago
13–11	14–9	107	89	38

TABLE VIII

The distribution of the IQ's for the 121 pupils of the University High School, Eugene, Oregon in absolute numbers and percentages compared with the distributions for Terman's[1] 905 unselected school children and Chase and Carpenter's[2] composite group at Chapel Hill, North Carolina.

[1] Terman, L. M.: " The Measurement of Intelligence," p. 66.

[2] Chase, H. W. and Carpenter, C. C.: The Response of a Composite Group to the Stanford Revision of the Binet-Simon Tests. *Journal of Educational Psychology*, 10, 1919, 179–188.

I.Q.	University High School, Eugene		Terman	Chapel Hill
	Number	Percentages		
56–65	2	1.4	0.33	1.5
66–75	5	4.2	2.3	7.7
76–85	5	4.2	8.6	20.0
86–95	21	17.4	20.1	43.1
96–105	27	22.3	33.9	23.1
106–115	21	17.4	23.1	4.6
116–125	22	18.2	9.0	0.0
126–135	15	12.4	2.3	0.0
136–145	3	2.5	0.55	0.0

The data from Chapel Hill is presented in the above because of the fact that it resembles the distribution for the University High School in being a composite group. Both distributions differ from Terman's in that there are unusually large numbers of very low grade children. However, on the whole, the Oregon children are decidedly a superior group in comparison with children at large. The large numbers of superior children in the University High School can be explained in part at least by the fact that the school draws heavily from homes connected with the University of Oregon. Moreover one of the adjoining districts contains a large percentage of professional classes. Of the eight pupils from homes connected with the University, none have I.Q.'s less than 100 and but two below 120, the highest being 141, and the median for this group is 125. Of 16 other pupils from homes of professional people (doctors, dentists, teachers, lawyers) two fall below an I.Q. of 100, the range being 90–141 with the median of this group at 118. The seven pupils falling below an I.Q. of 75 come without exception from the homes of unskilled laborers such as loggers, janitors, wood-sawyers, day laborers, and the like.

It is to be hoped that other studies covering the junior high school grades will soon be available for purposes of comparison much as Terman and his pupils[1] and others have done for certain of the elementary grades and as Proctor has carried out for the first year of the high school.

[1] Terman, L. M.: "The Intelligence of School Children." Houghton Mifflin Company, Boston, 1919.

TESTS FOR MENTAL ALERTNESS

L. W. SACKETT

The University of Texas

"To do things quickly *and* well is more than to do them quickly *or* well"—Baldwin.

The present study is an attempt to present simple tests based on conditions closely comparable with school work and capable of being administered as a mass test by an untrained and inexpert examiner. The purpose for which the tests were designed was to determine to what degree retardation in elementary schools is caused by, or at least accompanied by mental inertia, or slowness in regard to simple tasks. Its use, however, does not seem to be limited to this original purpose. The difficulty of getting a set of exercises comparable with school work and yet adapted to all the pupils is not small. It has not been fully accomplished in this attempt. That it has been more nearly approached than in some, is firmly believed.

The material used in this study was a short story prepared by the writer (Test 1), and a set of exercises based on the story (Test 2). The two exercises were printed on opposite sides of a sheet of paper 8½ x 11 inches, and each child tested was supplied with a copy. Directions were given orally and were likewise printed with the tests. For the first test space was left on the page for the pupil's reproduction.

Directions for Test 1: "Read the story through till you are sure you know it well. When you have finished, please cover the story with a book or paper, and tell it in your own words in the space below. Do not look at it again till you have finished writing."

A Story

"Mr. Adams once gave work in the store to two young men named William and James. James would stand outside of the door in the morning till the work bell had rung. He would quit work just as the bell rang in the evening. William was always ahead of time in the morning. He would finish his work in the evening even after the bell had rung. James always grumbled about his work. William would whistle and smile as he did everything that was asked of him. Now one of the young men is walking the streets looking for another place to work. The other is part owner of the store. Both boys had the same chance in the beginning."

Test 2

Directions for Test 2

The following are questions and exercises based on the story. Read them carefully and answer them or do what it says to do. Read the story again if you want to. Look at it as often as you care to while you work.

1. Which boy is now part owner of the store?.....
2. Draw a line under the name of the boy who lost his job and also under the word which tells why.
   William James careless cheerful
3. How many people are mentioned in the story?.....
4. Place a square around the words below which tell why one of the boys succeeded:
   early late obedient grumbling
5. Place a line under the word which tells what William was doing while James was standing outside the door.
   eating smoking working resting
6. Under each of these words put the first letter of the name of the young man whom it best describes:
   grumbling whistling industrious lazy
7. Make a word out of the first letters of the names of the three people mentioned in the story.....
8. At the first end of the line below write the first letter, and at the last end the last letter of the name of the boy who would quit work just as the bell rang in the evening.
9. If both boys pleased the merchant, draw a circle around the one of these letters which comes first in the alphabet:
   G B
10. If neither of the boys succeeded, make a word out of the three letters below; but if one of them failed, cross out the longest word in this sentence:
    s y e
11. One of the boys has opened a bank account. Which do you think it is?.....
12. Fill the blanks below with the names which you think ought to be there:
    "..... spent his evenings at home with reading and music.
    ..... could be found with idle companions any evening after supper."

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    "..... spent his evenings at home with reading and music.
    ..... could be found with idle companions any evening after supper."

13. Finish this sentence as it should be: "Both boys had the same chance in the beginning, but.....
.....
14. What ought to be the title of the story?.....
15. If James knows why he failed and wishes to succeed when he gets another place to work, give, with a single word, one of the things he must do that he did not do, and, with another single word, one of the things he must not do that he did before.....

Description of Tests.—It will be observed that the story is systematically designed. The introductory sentence is isolated from the others and gives a complete introduction to the story—naming the characters and setting the scenery. The two boys are named in the one order, but are taken up in the opposite order. This was done intentionally as a catch for the unwary. Two statements are made about James—the second using the pronoun. In like manner, statements are made about William. Then the two are again named in successive statements. Following this they are referred to as "the one" and "the other" without being named, but the reference is so obvious that few people in the recall note the fact that they are not named. The story closes with a simple isolated statement about both the boys and is, in a way, comparable with the first. These thoughts are not equally difficult to reproduce. This is particularly true of the last thought,—the story in the minds of many seeming to be complete in reproduction without the addition of that last reflection.

An examination of the questions and exercises in Test 2 reveals that it is at least thoughtfully if not wisely planned. Many people missed No. 3. By the phraseology at the beginning of No. 5, the idea of a "Square" is carried over from No. 4 and induces a very common error. This seems to be intensified by the fact that No. 2 had employed the "line under" reaction. No. 7 is a correction of No. 3 if an error had been made there, but is seldom noticed by one taking the test. No. 9 is probably the most treacherous point in the test due to the fact that the child loses the full force of the conditional clause in his attempt to get the directions clearly in view and interpolates an adversative direction to circle the letter which comes latest in the alphabet. This is increased by the fact that the child feels called upon to do something in the presence of every situation presented. Considerable liberty is granted in the answers to Nos. 13

and 14. No. 15 is extremely difficult in that the answers, at least one of them, will indicate what James must *be* rather than what he must *do*, or will contain more than one word. It is certain that the parts of Test 2 are not of equal difficulty, and they have been weighted each with its own value, though the weighted values do not figure in this study. The results are quite encouraging with the test as it is, and is, therefore, given this early presentation. All future use should employ the weighted values in scoring. For the fifteen parts of Test 2, the weights are 1, 4, 2, 5, 5, 8, 8, 6, 9, 5, 3, 4, 3, 5, 12, respectively.

Scoring.—The score in Test 1 depends on the number of complete thoughts properly reproduced in the pupils' version of the story. A perfect score is ten, the number of thoughts in the original. In the second it is the number of questions properly answered—any error or failure to follow directions invalidating the entire answer for the question in which it occurs. In each of these tests, the time from beginning to end was taken by the teacher passing through the room, and, as a child finished, marking the time upon the paper. In Test 1, the time for the whole procedure of reading and writing was taken as one interval. The justification of this lies in the fact that the directions are not unlike those of a school assignment. In it, one gets a measure of the child's judgment as to when he has properly prepared his lesson. If he spends too much time in studying his lesson his record is lowered by the amount of time he consumes in doing it. Whereas, if he spends too little time in study, his grade is lowered by the inadequacy of inaccuracy of his reproduction. There is a point of optimum efficiency in the balance of time for study and report. The child who finds it, makes optimum progress while those who fail on either side are handicapped. In like manner with Test 2, if the child goes slow and looks back frequently at the story, his accuracy may be improved, but his time is lengthened. The importance of this is seen in the method of securing a final grade from the scores and time records in each test. In each case the "score" forms the numerator and the "time" the denominator of a fraction while the resulting quotient is the index of ability in the test. This is here designated as an Alertness Quotient. Technically it is a "rate" by the formula in physics, "Work divided by Time equals Rate." It is here employed as an index of mental alertness. The pupil who scores the highest A.Q. must do a large amount of accurate work in a short time. A high degree of ability is thus shown by a large numerator and a small denominator, whereas, the lowering of the measure

of ability may be due to a decrease in the numerator (amount accomplished), or to an increase in the denominator (amount of time consumed).

Two people who score the same on accuracy, for instance two who get all of each of the tests correct, one in 7 and 9 minutes, the other in 9 and 10 minutes, respectively, have scored 143-164 and 111-150 respectively on the two tests. The final measures of ability show marked differences which the task accomplished did not reveal. Furthermore these measures are based more nearly on those things which make for promotion, demotion and retardation. In the tabulated results, the A.Q.'s appear without the decimal point or rather with the point moved two places to the right to avoid fractions. This does no serious violence to the measures since they bear no definite relation to any standard unity.

Administration of Tests.—The method of administering the tests was to furnish each teacher with a full set of instructions and cautions on giving the tests, complete directions for grading and calculation of A.Q.'s and blanks on which to make special report on the characteristics of the children in her room whom she considered exceptional —either retarded or accelerated. In the case of one large city where 4961 pupils in the fourth to seventh grades were tested the writer supplemented printed directions by an address before the principals of the city and by actually conducting the test with the principals in the way it was to be conducted with the children. In the smaller cities the work was done by the principals and superintendents who were doing cooperative research work with the writer. In all cases the original papers were sent in with the tabulated results and were inspected before the recorded scores were accepted. In most cases the work was faithfully and accurately done. In others it was necessary to revise the grading of all papers. Only grades four, five, six and seven of the public schools were tested, in any considerable numbers, though there is no reason why it would not be illuminating to use the tests in the higher grades and even in the universities. The preliminary results along that line are given without further discussion in table V.

Tables I, II, III and IV show summated returns from all school systems for the fourth, fifth, sixth and seventh grades respectively. Grade-to-grade improvement is very marked for both boys and girls as is also the superiority of the girls over the boys of the same grade. This sex difference is not well marked in the sixth grade but is clearly

set out in the other three. The same general tendencies are shown by each test and hold as generally true for the large school system as for the smaller ones.

TABLE I

Mental alertness quotients from fourth grade pupils in the nine cities reporting

City	Boys			Girls			Totals		
	No.	T-1	T-2	No.	T-1	T-2	No.	T-1	T-2
S.A.	804	42	50	718	46	56	1522	44	53
Tr.	13	37	44	21	34	47	34	35	46
C.	6	46	71	7	50	46	13	48	54
S.M.	5	36	70	5	44	60	10	40	65
M.	16	30	93	9	27	127	25	12	105
A.	12	25	50	11	50	67	23	37	58
I.	4	41	69	14	43	73	18	42	72
B.	17	40	67	25	100	73	42	76	70
Te.	10	44	71	12	52	61	22	48	66
Totals.	887	41	52	822	47	58	1709	44	59

TABLE II

Mental alertness quotients from fifth grade pupils in the nine cities reporting

City	Boys			Girls			Totals		
	No.	T-1	T-2	No.	T-1	T-2	No.	T-1	T-2
S. A.	711	66	74	660	72	79	1371	69	76
Tr.	14	56	50	11	46	112	25	31	77
C.	3	53	76	13	40	100	16	43	95
S. M.	6	145	235	10	190	370	16	181	313
M.	7	67	82	19	72	100	26	71	95
A.	19	73	111	20	57	98	39	65	104
I.	14	50	69	17	51	71	31	50	70
B.	11	83	110	22	90	112	33	88	111
Te.	13	54	75	15	67	79	28	61	77
Totals.	798	66	77	787	70	81	1585	69	77

TABLE III

Mental alertness quotients from sixth grade pupils in the nine cities reporting

City	Boys			Girls			Totals		
	No.	T-1	T-2	No.	T-1	T-2	No.	T-1	T-2
S. A.	508	99	99	605	101	100	1113	100	98
Tr.	8	75	94	17	17	112	25	76	106
C.	9	53	86	9	58	84	18	56	85
S. M.	8	275	297	3	227	308	11	261	300
M.	13	57	92	12	65	74	25	61	83
A.	11	86	106	19	81	112	30	83	110
I.	23	109	101	30	85	97	53	95	99
B.	28	91	110	37	89	100	65	89	104
Te.	5	46	98	6	100	124	11	75	112
Totals.	613	99	101	738	98	101	1351	98	101

TABLE IV

Mental alertness quotients from seventh grade pupils in the eight cities reporting

City	Boys			Girls			Totals		
	No.	T-1	T-2	No.	T-1	T-2	No.	T-1	T-2
S. A.	441	117	107	514	125	118	955	123	112
Tr.	8	74	98	23	85	115	31	82	110
C.	3	90	140	5	8	219	8	82	189
S. M.	...	...	...	15	167	162	15	167	162
M.	7	92	118	8	134	166	15	114	144
I.	13	111	134	14	125	139	27	118	136
B.	29	111	128	42	119	133	71	116	131
Te.	6	108	126	9	108	140	15	108	134
Totals.	507	115	109	630	124	122	1137	121	116

TABLE V

Mental alertness quotients from all grades in which the tests have been attempted. Grade standards.

Grade	4	5	6	7	8	9	10	11	Fr.	Soph.
Number.	1709	1585	1351	1137	146	78	50	35	108	193
A.Q. test 1.	44	69	98	121	107	117	120	114	200	207
A.Q. test 2.	55	77	101	116	165	118	152	140	266	284

TABLE VI
Age-grade scores for one large city

Aeg		Fourth grade			Fifth grade			Sixth grade			Seventh grade			Totals		
		No.	T-1	T-2	No.	T-1	T-2	No.	T-1	T-2	No.	T-1	T-2	No.	T-1	T-2
8	B	7	49	80	1	40	44	...	...	...	...	...	...	8	47	76
	G	10	46	57	...	..	..	...	...	...	...	...	...	10	46	57
9	B	82	46	64	5	72	78	...	...	...	...	...	...	87	47	65
	G	116	54	72	16	70	86	1	125	143	...	...	...	133	65	74
10	B	239	41	52	82	68	90	7	111	83	...	...	...	328	46	60
	G	231	41	56	89	74	96	7	123	133	...	...	...	329	54	68
11	B	210	42	48	229	68	75	59	95	110	6	96	119	504	58	67
	G	188	44	53	256	72	82	99	98	112	15	146	152	558	64	77
12	B	138	37	46	172	64	67	183	89	92	77	121	120	570	66	74
	G	83	37	42	170	73	77	235	96	102	119	117	121	607	79	86
13	B	73	30	31	122	59	64	143	90	89	167	107	111	505	70	76
	G	58	48	39	84	58	50	156	91	90	187	121	116	485	85	86
14	B	35	29	29	65	52	60	82	78	76	129	110	100	311	71	74
	G	33	29	32	40	58	64	78	71	80	132	117	101	283	78	79
15	B	15	25	22	17	47	41	16	86	89	55	112	90	103	69	67
	G	6	42	76	13	38	40	31	83	82	59	122	99	109	88	83
16	B	2	37	32	2	58	69	6	69	86	15	97	82	25	76	75
	G	4	28	20	3	32	18	7	51	61	16	91	85	30	60	59
17	B	1	19	50	...	..	..	...	...	...	5	86	82	6	59	73
	G	1	19	15	...	..	..	...	...	...	1	112	88	2	50	43
18	B	...	..	..	...	..	..	...	...	...	1	80	133	1	80	133
	G	...	..	..	...	..	..	1	91	108	...	...	...	1	91	108

Taking school S. A. as a basis for more careful study, many interesting facts may be discovered. First, the grade distributions indicate that pupils of this school system are making somewhat normal progress by grades and years. One is hardly prepared, however, for the grade results by scores to show that the younger pupils in any grade test so much higher than the older ones in such a measure of mental alertness. But such seems to be the case in every grade for both boys and girls and by both of the tests employed. Excluding the roughness of the curve at the extremities where the number of cases is small, there is a general downward trend of the magnitude of A.Q.'s as the older pupils in the same grade are tested. This can only mean that a pupil in this school system is promoted on the basis of his ability to do work rather than on the basis of the knowledge he has already acquired, of that the two things correlate well. The

TABLE VII

Fourth grade scores for the schools of one large city (S. A.)

School	Boys			Girls			Totals		
	No.	T-1	T-2	No.	T-1	T-2	No.	T-1	T-2
1	22	40	56	21	40	58	43	40	57
2	41	44	57	52	44	56	93	44	57
3	37	46	62	25	36	68	62	40	64
4	28	46	52	25	49	56	53	47	54
5	25	42	51	26	48	67	51	46	59
6	35	39	43	30	46	49	65	24	46
7	17	34	29	18	32	31	35	33	30
8	31	33	27	31	38	26	62	36	26
9	44	27	28	42	27	40	86	27	34
10	33	40	51	33	44	56	66	42	54
11	52	62	65	39	69	90	91	65	76
12	30	44	63	18	40	51	48	42	58
14	22	44	48	24	53	61	46	49	55
15	20	31	39	19	54	55	48	40	45
16	25	44	48	31	58	66	56	52	58
17	36	37	58	14	29	52	50	35	56
18	23	37	45	14	48	59	37	41	50
19	30	38	40	26	45	53	56	51	46
21	34	22	18	24	28	23	58	24	20
22	49	38	51	45	43	54	94	41	52
23	25	45	69	25	49	67	50	47	68
24	30	77	55	22	82	66	52	79	60
25	8	22	31	7	22	37	15	22	34
26	18	38	58	20	49	73	38	44	66
27	15	41	65	27	40	64	42	40	64
28	15	56	77	13	68	91	28	62	84
29	16	31	32	17	25	29	33	28	30
30	34	61	64	30	51	59	64	56	62
Totals (28)....	804	42	50	718	46	56	1522	44	53

writer's knowledge of this superintendent and of his philosophy of education makes the returns less suprising but none the less significant. At the same time, greater confidence is inspired in the probability that the tests carefully administered in any system will show actual conditions of promotion and retardation.

Tables VII to X show the reports of the various school units in this school system by grade and sex. There is considerable overlapping of the grade to grade scores between the various wards of the city. In general, however, there is a well marked superiority of the fifth grade

TABLE VIII

Fifth grade scores for one large city (S. A.)

School	Boys			Girls			Totals		
	No.	T-1	T-2	No.	T-1	T-2	No.	T-1	T-2
2	54	66	71	37	73	83	91	69	76
3	28	65	73	27	70	78	55	68	75
4	21	64	60	31	82	85	52	75	75
5	25	65	76	18	67	76	42	66	76
6	21	61	74	25	66	74	46	64	74
7	42	72	68	23	69	57	65	71	64
8	18	41	63	17	38	51	35	40	57
9	39	45	54	26	47	51	65	46	53
10	51	68	84	37	89	99	88	77	90
11	47	65	87	48	81	103	95	73	95
12	22	70	67	29	72	78	51	71	73
13	36	66	74	26	78	100	62	76	88
14	22	63	70	19	58	66	41	61	68
15	21	70	68	19	68	76	40	69	72
16	27	69	91	40	67	87	67	68	89
17	14	63	56	23	71	74	37	68	67
18	17	60	76	17	53	80	34	57	78
19	35	67	65	16	64	75	51	66	68
22	33	59	78	40	67	85	72	62	82
23	25	77	91	20	68	69	45	73	81
24	17	97	70	33	113	82	50	108	78
26	29	73	91	25	99	98	54	85	94
27	25	65	72	17	74	74	42	69	73
29	21	43	42	26	40	43	47	41	42
30	22	78	81	21	74	80	43	76	81
Totals (25)....	711	66	74	660	72	79	1371	69	76

median over that of the fourth, a like superiority of the sixth over the fifth and a less well defined difference between the sixth and seventh. This latter is not an uncommon finding and indicates that there is usually a residue of incompetent pupils left in the grade just preceding the high school. It will be remembered in this connection that Texas schools in common with most other systems of the Southern States, comprise only seven grades below the high school. There is, however, a very noticeable and significant feature of the results which was not anticipated and is not easily explained. Although no special effort was made in the beginning to have the two tests of equal difficulty, it is observed that the scores similarly calculated are somewhat compar-

TABLE IX

Sixth grade scores for one large city (S. A.)

School	Boys			Girls			Totals		
	No.	T-1	T-2	No	T-1	T-2	No.	T-1	T-2
2	31	93	94	39	97	107	70	95	101
3	17	87	94	20	104	117	37	96	106
4	21	97	96	29	89	118	50	98	109
5	26	132	110	27	133	116	53	132	113
6	14	66	81	15	64	59	29	65	70
7	5	83	84	15	61	62	20	66	68
8	25	100	64	20	110	71	45	104	67
9	26	71	80	29	78	73	55	74	76
10	39	93	98	55	102	115	94	98	108
11	32	97	112	46	90	117	78	93	115
12	19	279	102	20	259	111	39	269	107
13	29	101	125	26	106	121	55	103	123
14	11	105	113	10	94	121	21	100	117
15	9	78	74	20	81	90	29	80	85
16	23	79	101	18	141	115	41	106	107
17	13	92	72	15	91	84	28	92	78
18	12	92	64	16	106	86	28	100	76
19	14	88	71	20	83	67	34	85	69
22	24	70	81	25	71	87	49	71	84
23	25	86	106	26	88	108	51	87	107
24	19	135	120	21	150	111	40	143	116
26	17	107	103	25	90	101	42	97	102
27	16	83	91	22	91	88	38	88	89
29	8	53	84	14	51	66	22	52	72
30	33	81	91	32	88	100	65	84	96
Totals (25)....	508	99	99	605	101	100	1113	100	98

able. The fourth grade does better on Test 2 where whey were to answer certain questions on Test 1 where the task was learning and reproduction. The same thing is true of the fifth grade. In the sixth, however, the scores are almost equal for the two tests, while in the seventh grade, results are not only more scattered but are distinctly lower on the second test. Indeed the general plateau in the seventh grade seems to be occasioned almost entirely by the technical difficulties of the second test. Whether this is due to the character of the school training or to a pronounced lag in the development of the

TABLE X

Seventh grade scores for one large city (S. A.)

School	Boys			Girls			Totals		
	No.	T-1	T-2	No.	T-1	T-2	No.	T-1	T- 2
2	35	116	114	41	136	115	76	127	115
3	11	186	95	9	121	92	20	156	94
4	10	119	157	21	126	134	31	124	142
8	10	111	59	7	71	67	17	94	62
9	23	93	96	25	105	98	52	99	97
10	40	105	111	39	121	122	79	113	116
11	29	113	128	27	123	136	56	118	132
13	26	114	133	37	129	145	63	125	140
14	7	126	112	5	129	128	12	127	119
16	20	100	102	26	100	114	46	100	108
17	10	98	84	15	124	98	25	114	92
19	5	135	87	8	109	73	13	119	78
20 S	15	90	90	14	114	112	29	102	101
20 B	15	145	104	15	158	107	30	151	106
20 D	12	134	88	17	182	130	29	162	113
20 Sk	15	118	153	13	117	155	28	118	154
20 Rd	15	132	104	15	150	140	30	141	122
20 u	9	118	102	21	155	130	30	144	122
20 Rs	10	219	157	14	251	180	24	238	170
20 A	19	99	100	13	102	113	32	100	105
20 H	8	179	128	15	165	122	23	170	124
22	8	99	97	16	100	92	24	100	94
23	25	101	95	29	89	90	54	94	92
24	4	250	120	9	140	99	13	170	100
26	14	162	66	13	175	82	27	168	74
27	15	79	96	12	92	107	27	85	101
30	31	99	104	34	104	100	65	102	102
Totals (27)....	441	117	107	514	125	118	955	123	112

ability to follow definite directions, or to a general slump in the reading habits from attention to the small details to a grasp of the larger relations only, or to some still less easily defined cause is not certain. The fact is certainly significant of something, and deserves further investigation. Whatever it is, it seems to bear a close relation to the set of requirements thought to be essential for good high school work.

Exceptional Pupils.—Still another aspect to be considered is a study

TABLE IX

Sixth grade scores for one large city (S. A.)

School	Boys			Girls			Totals		
	No.	T-1	T-2	No	T-1	T-2	No.	T-1	T-2
2	31	93	94	39	97	107	70	95	101
3	17	87	94	20	104	117	37	96	106
4	21	97	96	29	89	118	50	98	109
5	26	132	110	27	133	116	53	132	113
6	14	66	81	15	64	59	29	65	70
7	5	83	84	15	61	62	20	66	68
8	25	100	64	20	110	71	45	104	67
9	26	71	80	29	78	73	55	74	76
10	39	93	98	55	102	115	94	98	108
11	32	97	112	46	90	117	78	93	115
12	19	279	102	20	259	111	39	269	107
13	29	101	125	26	106	121	55	103	123
14	11	105	113	10	94	121	21	100	117
15	9	78	74	20	81	90	29	80	85
16	23	79	101	18	141	115	41	106	107
17	13	92	72	15	91	84	28	92	78
18	12	92	64	16	106	86	28	100	76
19	14	88	71	20	83	67	34	85	69
22	24	70	81	25	71	87	49	71	84
23	25	86	106	26	88	108	51	87	107
24	19	135	120	21	150	111	40	143	116
26	17	107	103	25	90	101	42	97	102
27	16	83	91	22	91	88	38	88	89
29	8	53	84	14	51	66	22	52	72
30	33	81	91	32	88	100	65	84	96
Totals (25)....	508	99	99	605	101	100	1113	100	98

able. The fourth grade does better on Test 2 where whey were to answer certain questions on Test 1 where the task was learning and reproduction. The same thing is true of the fifth grade. In the sixth, however, the scores are almost equal for the two tests, while in the seventh grade, results are not only more scattered but are distinctly lower on the second test. Indeed the general plateau in the seventh grade seems to be occasioned almost entirely by the technical difficulties of the second test. Whether this is due to the character of the school training or to a pronounced lag in the development of the

TABLE X

Seventh grade scores for one large city (S. A.)

School	Boys			Girls			Totals		
	No.	T-1	T-2	No.	T-1	T-2	No.	T-1	T- 2
2	35	116	114	41	136	115	76	127	115
3	11	186	95	9	121	92	20	156	94
4	10	119	157	21	126	134	31	124	142
8	10	111	59	7	71	67	17	94	62
9	23	93	96	25	105	98	52	99	97
10	40	105	111	39	121	122	79	113	116
11	29	113	128	27	123	136	56	118	132
13	26	114	133	37	129	145	63	125	140
14	7	126	112	5	129	128	12	127	119
16	20	100	102	26	100	114	46	100	108
17	10	98	84	15	124	98	25	114	92
19	5	135	87	8	109	73	13	119	78
20 S	15	90	90	14	114	112	29	102	101
20 B	15	145	104	15	158	107	30	151	106
20 D	12	134	88	17	182	130	29	162	113
20 Sk	15	118	153	13	117	155	28	118	154
20 Rd	15	132	104	15	150	140	30	141	122
20 u	9	118	102	21	155	130	30	144	122
20 Rs	10	219	157	14	251	180	24	238	170
20 A	19	99	100	13	102	113	32	100	105
20 H	8	179	128	15	165	122	23	170	124
22	8	99	97	16	100	92	24	100	94
23	25	101	95	29	89	90	54	94	92
24	4	250	120	9	140	99	13	170	100
26	14	162	66	13	175	82	27	168	74
27	15	79	96	12	92	107	27	85	101
30	31	99	104	34	104	100	65	102	102
Totals (27)....	441	117	107	514	125	118	955	123	112

ability to follow definite directions, or to a general slump in the reading habits from attention to the small details to a grasp of the larger relations only, or to some still less easily defined cause is not certain. The fact is certainly significant of something, and deserves further investigation. Whatever it is, it seems to bear a close relation to the set of requirements thought to be essential for good high school work.

Exceptional Pupils.—Still another aspect to be considered is a study

TABLE XI

Scores of pupils reported by teachers as being retarded

Grade	No.	Age	Yrs. in Sch.	T-1	St-1	T-2	St-2
Boys							
4	20	12	5.8	31	41	38	52
5	6	14.5	7.0	53	66	40	77
6	8	13.9	7.0	62	99	72	101
7	8	15.1	8.0	65	115	86	109
Girls							
4	17	13.5	5.8	28	47	44	58
5	6	14.5	7.3	32	70	44	81
6	7	13.9	7.9	80	98	50	101
7	6	14.8	8.5	121	125	95	122

TABLE XII

Scores gleaned from records of retarded pupils

Grade	No.	Age	Yrs. in Sch.	T-1	St-1	T-2	St-2
Boys							
4	75	13.3	5.5	32	41	38	52
5	85	13.3	6.5	53	66	64	77
6	58	14	7.3	82	99	77	101
7	32	14.7	8.1	103	115	90	109
Girls							
4	54	13	5.8	30	46	39	38
5	57	13.4	6.5	51	72	61	81
6	38	13.8	7.3	80	101	81	101
7	33	14.8	8.1	98	125	88	122

of the scores made by those pupils whom the teacher in an "Exceptional Child Report" designated as either accelerated or retarded. Tables XI and XIII show these results in some detail. In Table XI the report on retarded pupils, every grade record is below the standard for the grade and sex. In Table XIII, the report on accelerated pupils, only one grade record is below the standard for the group. The result holds true for both boys and girls. This general result was, of course, to be expected if the tests were giving results closely correlated with the teacher's judgment. In other words, the pupils whom the teachers

TABLE XIII

Scores of pupils reported by teachers as being accelerated

Grade	No.	Age	Yrs. in sch.	T-1	St-2	T-2	St-2
Boys							
4	14	9.6	2.9	59	41	75	52
5	12	10.8	3.3	101	66	120	77
6	8	11	3.9	99	99	114	101
7	9	12.8	4.7	109	115	139	105
Girls							
4	12	9.8	3.2	49	46	49	58
5	9	10.8	3.5	92	72	124	81
6	7	11.7	4.4	137	101	126	101
7	11	12.2	4.5	131	125	173	122

TABLE XIV

Scores gleaned from records of accelerated pupils

Grade	No.	Age	Yrs. in sch.	T-1	St-2	T-2	St-2
Boys							
4	32	10.2	2.1	48	41	69	52
5	61	11	2.9	68	66	77	77
6	49	12.1	3.7	95	99	118	101
7	56	12.7	4.6	18	115	114	105
Girls							
4	38	10.1	2.06	45	47	100	58
5	64	11.0	3.0	70	70	75	81
6	71	11.6	3.8	110	98	104	101
7	93	12.8	4.8	127	124	123	122

consider retarded make a poor showing with the test. On the other hand those whom the teachers consider accelerated make a superior showing in the tests.

The original record sheets were then inspected and the retarded and accelerated pupils selected on the basis of age and grade in school. Assuming that a pupil started regularly and progressed normally one grade in one year, he was considered retarded if he was more than one year older than the normal age for his grade, and accelerated if he was more than one year younger than the normal age for his grade. Differ-

ences of a single year were not considered exceptional. These results are shown in Tables XII and XIV. The numbers are much more representative than those above and still show that, apart from the judgment of the teacher as to the retardation or acceleration of the child, the tests will differentiate them into accelerated and retarded groups. Again, in every case, except one, the grade for the group of retarded pupils is below that of the general average for the group for both boys and girls. In Table XIV in only three out of sixteen cases is the group grade for the accelerated pupils below that of the normal for the corresponding group.

Conclusions

From the results as they now stand, the following conclusions seem to be warranted:

1. The two tests combined form a fairly reliable measure of the pupils' ability to do ordinary school work.

2. The importance of general mental sluggishness as a factor in school retardation may have been somewhat overlooked in our search for causes among attendance statistics, teaching methods, etc.

3. The reversal of the relative difficulty of two such tasks from the fifth to the seventh grades is probably a sympton of some fundamental but hitherto undetected and undefined defect in the upper grade training. Since the tests are based upon silent reading, the result may be due to an uncompleted change in the general reading habits.

4. The tests in the time of a few minutes reveal the ability of the several members of the class to do general school work almost as accurately as the teacher by general observation can determine it after many months of intimate acquaintance. The use of the tests for the borderline cases between promotion and non-promotion would seem to be justified.

5. This diagnostic result is more reliable in relation to the subnormal than to the supernormal, but is quite satisfactory as a means of classifying this latter group.

7. The content of the story and the character of the exercises make the labor of the tests well worth the child's time. Many school tests certainly fail in this regard, and thus bring the whole experimental program into disrepute. Experience with this one is quite the reverse.

6. Reading difficulties preclude the use of the tests to any great extent below the fourth grade, but there seems to be no reason why its use cannot be extended to the higher grades even through the high school and into the University.

AN APPROACH TO THE SYNTHETIC STUDY OF INTEREST IN EDUCATION: PART III

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Chapter Four. Social Modification of Interest

We have here to consider a second stage in the normal development of interest. Yet while the distinction between stages is largely genetic, as implying progressive development of primary biological tendencies, the present discussion must also trace from early childhood certain environmental influences which modify these tendencies. Such social influences as are implied by various forms of imitation and suggestion, both modify and select organic impulses at every age. It is accordingly important to note the effect of such influences upon the expression of adolescent interests and the consequent modification of types as previously described.

The significance of this new approach lies in the nature of the learning process. For the infant the purpose achieved and the knowledge gained are purely incidental products of the course of interesting action, performed experimentally for its own sake. Instinct provides the occasion and interest initiates the action. Similarly when the actions of others are reproduced, there must be postulated an acquired instinct[1] for imitation consisting of a fusion of such organic instincts as respond to occasions possessing qualities known as suggestive.[2] Imitation implies that another's actions are of interest in themselves. Their reproduction by the observer leads to recognition of the purpose and so to interest in the result. He thus rises from sensory to perceptual imitation and, when the model is absent, to conceptual imitation. Hence imitation regarded as a "social" instinct modifies experimental interests by rendering certain actions habitual and causing their ends to be taken-for-granted, so that learning proceeds with greater economy. Such modification occurs chiefly through the agencies of inner imitation or sympathetic insight, outer imitation, and suggestion, which facilitates both. Each of these agencies may be briefly noticed in turn.

Keatinge classifies imitative behavior under the headings of instinctive, conscious, and purposive,—the last including acts per-

[1] Not an inherited instinct. *cf.* W. McDougall, "Social Psychology," pp. 90ff; Ribot, "Psychologie des Sentiments," note 1, p. 238.

[2] *cf.* Keatinge's list, "Suggestion in Education," p. 56.

formed *per se*, for practical ends, and for reasons of self-esteem.[1] Instinctive or inner imitation differs from other forms both in function and in earlier appearance. Its function, in a word, is to bring about conformity to certain situations by inhibiting instinctive tendencies to dominate them. Such reactions are thus largely *adaptive*, as contrasted with the *aggressive* varieties of interest hitherto considered. These phenomena of instinctive imitation are conveniently classified as fellow-feeling with man (einfühlung), fellow-feeling with nature and absorption in the object (einsfühlung).[2] Since the process in each of these forms is relatively similar, the first alone may serve to explain the rise of interest in conformity. Fellow-feeling arises from the infant's response to differences in personality. "As early as the second month it distinguishes its mother's or its nurse's touch in the dark. It learns characteristic methods of holding, taking up, patting, and adapts itself to these personal variations. It is quite a different thing from the child's behavior toward things which are not persons."[3] By this awareness the child distinguishes between himself and others. Certain feelings associated with self are then attributed to others when they perform corresponding movements. Thus feelings of self and of other are mutually dependent. The adaptive self shares in the personality of others by assuming their attitudes so far as these have meaning from his own experience. He appreciates differences in such attitudes by virtue of his practical interest. To certain attitudes, those of his elders, he must at times submit. Those of his juniors, he may usually dominate. Practical interest in situations beyond his control is best realized by conformity and in other situations by aggression. The resulting action in childhood is merely the motor expression of a certain combination of elements and is entirely without moral significance.[4] Yet moral interest can only arise from the need of conformity to various social situations. The further development of this interest in conformity may now be traced.

At about the fourth year the child learns to identify his own reactions to situations beyond his control with others' reactions to situations within his control. He recognizes that certain of his own interests are shared by others. Conscious recognition of his own interest as seeking certain ends must allow others the privilege of seek-

[1] *Ibid.*, p. 86.
[2] Most satisfactorily perhaps by Baldwin, Lipps, and Mitchell, *op. cit.*
[3] Baldwin, "Mental Development in Child and Race," p. 335.
[4] See Lee, *op. cit.*, p. 240 regarding "the moral necessity of disobedience."

ing the same ends. At this stage his acts become socially significant. When the legitimate interests of others are opposed, he perceives that the other must feel as he does in such cases, and his sense of justice is accordingly offended. By fellow-feeling with the group he takes over their interests as his own and accepts their standards for himself to some degree. Here begins the compromise of the social life,—the adaptation of the group to his personal interests and the adjustment of these interests to the standards of the group.[1] This community of interest explains *loyalty* as the pursuit of one's own interests when these are sought by the group as a whole. As the group is progressively widened from the family to the playmate, the gang, the school, the town, etc., each new interest is first opposed by and then admitted to the fellowship of interests which at the time have become habitual. This equality of group interests implies the *moral* sense. Loyalty to group involves some sacrifice of conflicting personal interest. The satisfactions of successful conformity to group interests make the individual reluctant to aggress when the opportunity offers. Fidelity to certain personal standards of conduct is the condition of all group membership, which practical interest in superiority obliges him to retain. Such recognition of common interests further indicates the rise of purposeful conduct since the type of interest is determined by the social requirements of the situation. Whereas the expression of experimental interests is directed by necessity, social interest is largely regulated by success.

Such interest in conformity is well illustrated by the formation of clubs. The subordination of the individual is complete as is also his obedience to the "natural" leader, who holds his supremacy by power to express such interests as are most intense within the group as a whole. Membership implies a common sentiment against the offender, sympathy for the unfortunate members, and the preserving of group identity by special insignia, conventions, etc. Such deference to the group becomes universalized in fashion,—a conformity to the dictates of society in the large. Activities performed by the group intensify interest more than proportionately to the aggregate of individual interests expressed. Hence convention requires certain attitudes receiving group sanction to be taken-for-granted; thus

[1] This compromise is termed by Baldwin "the interest of learning." "It brings about through imitation, absorption, and trial, the progressive modification of personal habit in conformity to developing social ends." *Thought and Things*, III, p. 124.

modifying to some degree the natural expression of individual interest.

Returning to the conscious and purposive forms of outer imitation, we have to note the process by which certain experimental interests are selected for continued expression in the group. This process differs from the fellow-feeling just considered in that reproduction of another's actions does not imply reproduction of his thought. Such acts as are consciously reproduced are performed as a means of greater achievement and hence of greater social superiority. Aggressive attitudes are the rule and adaptive attitudes are taken only when such are necessary for continued self-expression. Yet with theoretical difference in function, the effects of both imitative processes are similar in that each gives rise to aggressive and adaptive interests. Hence inner and outer imitation are complementary, are instinctive in origin, and develop simultaneously. Some examples of experimental practical interests as expressed in group play may serve to illustrate this selective function of outer imitation more clearly.

Participation in playful or angry contests seldom appears before the third year and then usually in the form of feeble wrestling, yet a two year old shows pleasure in striking someone who pretends to be hurt.[1] Shortly after the third year this interest in *superiority* is revealed in all group play. Wrestling, shoving, racing, and all kinds of competitive games show that the fight is an end in itself.[2] The same interest lies in all resistance to authority, contradiction of elders and equals, and in such mental contests as board and card games when the element of chance is excluded. In games of pure rivalry, the fight interest is heightened by the feeling of jealousy. Interest in superiority here seeks the distinction of leadership; first, because others want it, and also because of the praise which recognition of superiority entails. Emulation differs from jealousy in that admiration is sought rather than love and often takes the form of boasting. "To lift heavier weights, to throw farther, to run faster, to jump higher, to make a top spin longer, to stay longer under water . . . is the burning wish of every childish heart."[3] Other varieties of interest in superiority occur in teasing and in assuming provocative attitudes towards those who may not be insulted by words.[4] Closely

[1] Groos, *op. cit.*, p. 174.
[2] O'Shea, "Interest in Childhood," *Child Study Monthly*, 11: 266–278.
[3] Groos, *op. cit.*, p. 199.
[4] *cf.* Chamberlain, *op. cit.*, pp. 262ff.

related is interest in the practical joke. The perpetrator has interest first in superiority to and then in fellow-feeling with the victim.

Such familiar behavior emphasizes the significance of interest in superiority, the social expression of experimental interest in achievement. The fact that in children this interest can find expression only in the society of equals renders it a powerful esprit de corps. Thus even the aggressive self implies an indirect group interest. Social recognition requires that certain personal achievements find favor with the group, and aggressive interests so sanctioned tend rapidly to become habitual, largely determining the child's early ambitions and ideals.[1] Outer imitation may produce interest either in the activity itself or in its result. The former involves intellectual experiment and the latter rivalry. Thus while outer imitation, like fellow-feeling, requires adaptation to group interest and hence the pursuit of social ends, its chief function is to select certain aggressive interests which in certain situations may safely be pursued to the end of personal superiority.

Before considering the theoretical effect of these phenomena upon the expression of experimental types of interest, the function of suggestion deserves comment. While suggestion no doubt offers a fairly adequate explanation of all imitative behavior, its separate treatment emphasizes the means by which imitation can be objectively controlled. Various qualities which render an idea suggestive, such as mass, break in continuity, expectedness, intelligibility, and pleasantness, are common to varieties of experimental interest. These qualities accordingly render any activity attractive, and the instinctive response thus produced accounts for imitation no less than other behavior. Yet the distinguishing feature of the suggested imitative response is its prepotency over other more habitual responses. Keatinge's definition explains this prepotency in terms of interest-intensity: "A suggestive idea is one which exercises a disintegrating (dissociative) influence on the mind in such a way that critical and inhibitory ideas are rendered ineffective. . . The suggestive idea, while it need not be independent of knowledge, leads straight to action or belief."[2] Hence in neural terms the suggestive idea takes possession either by directly stimulating involuntary attention through sense appeal or by such non-voluntary reinforcement of previous dispositions

[1] *cf.* Darrah, *Popular Sc. Monthly*, 53:88; Monroe, *Education*, 18:259; Jegi, *Trans. Illinois Society for Child Study*, 3:131–144; Taylor, *Report State Sup't of N. Y.*, 1896; Barnes, *Studies in Education, passim.*

[2] *op. cit.*, p. 54.

that conflicting tendencies are inhibited. Certain typical conditions are evident. First, an idea becomes suggestive when its very remoteness from existing ideas is the fact attended to—witness the conjuror's movements and the emphatic statement of the orator who "takes his audience by storm." Second, the idea must avoid association with conflicting impressions and find association so far as possible, with favorable impressions. Also while the suggestion may be compatible with prevalent ideas, it must avoid over-emphasis. The effect of certain advertisements and of much class-room advice is often the opposite of the effect intended. A third condition is the subject's attitude toward the suggester, who should be trusted, loved, or feared. Confidence and love imply the medium of common interests, which alone tends to repress unfavorable associations. Fear carries conviction by sheer intensity of reinforcement. While the complexities of the dissociative process in suggestion are scarcely intimated by this summary, the outline should indicate the role of suggestion as a factor of social interest and something as to its relation to other factors discussed elsewhere. It should also be noted that, however offered, suggestion assists learning only in so far as the suggested impression is confirmed by voluntary effort of attention. Otherwise, as in hypnosis, interest in the new is transient and ineffective because unassociated with the old.

Behavioristic studies of adolescent interests in general have as yet established little more than the fact that such interests are the most diverse. No valid criteria exist to determine the relative frequency of various nascent social interests. All attempts to correlate such tendencies with instinctive impulse on the one hand and with mature behavior on the other must consequently rely on the consensus of theoretical opinion. To this end the simplest course will be to indicate somewhat schematically such sub-divisions in the types of instinctive interest as must in theory result from social modifications outlined in this chapter. Theoretically, then, each type contains two such sub-divisions distinguished by aggressive and adaptive social attitudes,—the former implying extrinsic interest in the situation itself as being of near or ultimate usefuluess, and the latter implying an intrinsic interest in thought of the situation as being of such a nature.[1] Extrinsic interest thus regards the situation as a *means* of

[1] Intrinsic interest should not be confused with "purely intrinsic" interest, the term applied to the unmodified type of experimental interest in mere indulgence of feeling. The distinctions here made are taken directly from W. Mitchell's analysis, *op. cit.*, pp. 65–70.

realizing primary interest in any of the three types whose end may be either agreeable feeling, or desirable action, or meaning applicable to conduct. Intrinsic interest regards the situation as an end on account of the nature of the feelings, acts, or thoughts immediately involved. The character of these modifications may be suggested as effecting each type.

As applied to the practical type, we have seen that individual interest may become socialized either by becoming partly identified with that of the group, so as better to make use of a particular situation or by partial conflict with that of the group, which involves thought of the situation and justice to the interests of others concerned. The former experience expresses the extrinsic or *purely practical* interest in the utility of the situation as means to an end and includes such aggressive varieties as pursuit, emulation, rivalry, *et al.* The latter expresses the intrinsic or *moral* interest in the situation as it is thought or as an end in itself, and includes such adaptive varieties as obedience, loyalty, self-control, consistency to personal standards, *et al.* This interest also perceives such qualities as bravery, deceitfulness, and cowardice as these affect conduct, for this is a strictly practical consideration when applied to others.

Cognitive interest in a perplexing situation instead of seeking the acquirement of knowledge as such, may seek to understand it as affecting future conduct. Interest attempts to relate the situation to habitual experience and place it in the system in which it belongs, as in the discovery that drunkards may be good men and preachers the reverse. Such interest of the extrinsic sort may be termed *rational.* This is related to objects as real, as having a certain identity. When the intrinsic interest is exclusively vested in the knowledge itself, it may be termed purely *theoretical.* It implies "interest in a truth which a thought claims or seeks." This close relation between moral and rational interests as distinct from the purely practical and theoretical, suggests the normal distribution of social interest regardless of type. The latter forms may represent the survival of selected experimental interest in the social stage.

Because of the primacy of purely intrinsic interest in all experience, the intrinsic elements of the practical and cognitive types constitute social modifications of the purely intrinsic type. When absorbed in a situation—whether in landscape, music, or drama—our interest is expressed largely in the indulgence of feeling, and this element, the aesthetic, is therefore constant. When interest seeks only abstrac-

tion from reality, the experimental interest in pure sensation is continued without appreciable change. Yet surrender to feelings because of their relation to reality implies the introduction of a relatively extrinsic element. Thus contemplation of the character of Jesus may produce in the man of piety a state of absorption in which his own moral interest in self-sacrifice for the many becomes the occasion for the affective indulgence. The philosopher may in the same instance be absorbed in the theoretical significance of self-realization. Hence the subdivisions of the purely intrinsic type may consist of aesthetic, moral, and theoretical interests.

Social interests imply a certain degree of physical maturity, for one reason in that development of the ductless glands is connected with control of emotional reactions. Hence from the time when aggressive interests are first to some degree identified with adaptive interests, normal development implies the increasing control of the latter until an approximate balance is reached. Thereafter behavior is directed by such interests as are rendered habitual by successful expression in the particular environment. Certain phenonema of such expression are next to be considered.

Chapter Five. Social Expression of Interest

The varieties of social behavior are identical with life itself and as such defy classification by means hitherto employed. For this reason the following description of the approach to a study of habitual interest makes no attempt to correlate specific phenomena, but instead seeks to indicate certain tendencies that govern the later expression of interests already distinguished. More concretely, we are to consider the nature of certain reactions to success and failure in environmental adjustment. The effect of these reactions is understood to determine the balance between aggressive and adaptive interests by which habitual attitudes and, in a sense, character become established.

That all growth and hence all behavior depends essentially upon the interaction of aggressive and adaptive attitudes variously defined, is well supported by both scientific and empirical evidence.[1] While the two attitudes are present as common elements in most situations, there are other situations in which one attitude may find expression to the practical exclusion of the other. The freshman from a provincial high school must for the most part conform to the new demands

[1] *cf.* Brewer: "The Vocational Guidance Movement," p. 105.

of university life. In his senior year aggressive interests may seek more fully to realize personal superiority: yet their fullest expression is resisted by various social influences whose existence has been taken-for-granted. This familiar experience suggests that the ratio of aggressive and adaptive interests explaining the individual's behavior in particular situations, is determined by the degree of such resistance.

The use of the term "resistance" in connection with the expression of social interest at once suggests the application of psychoanalytic theory. Quite apart from its still discredited practice and most of the sex diagnosis involved,[1] the central notion of this theory contains much of approved value. Such indirect applications as have been made in the fields of industry by the late Carleton Parker and A. H. Southard among others, in medicine by numerous British and American psychiatrists chiefly in connection with war neuroses, and still more recently in education by the English writers, H. C. Cameron,[2] C. W. Kimmins,[3] and St. G. F. Pitt[4]—have largely vindicated the underlying principles as helpful approaches to problems of social readjustment. It may further be noted that the effect of many excellent critical treatments[5] has been to remove the arbitrary distinction formerly made between normal and abnormal cases. While unquestionably the value of the remedy depends upon the abnormality of the case, it is widely recognized that the same phenomena appear in the so called normal cases to some degree. Confidence is therefore justified in such clearly operative principles as apply to the social expression of interest.

Fundamental in this notion of the unconscious is the view that all mental activity implies a life impulse, variously defined, which is the force that reveals itself as interest. "It is with the utilization, expression, and application of interest that the unconscious continually concerns itself."[6] By virtue of this biological source, the interest thus seeking expression is essentially instinctive and hence aggres-

[1] *cf.* McDougall, "Social Psychology," pp. 394ff.

[2] "The Nervous Child."

[3] "Children's Dreams."

[4] "The Purpose of Education."

[5] For example, the series of articles published in the *London Times Educational Supplement* commencing May 27, 1920.

[6] M. Nicoll, *op. cit.*, p. 83; see also W. A. White, "Mechanisms of Character Formation," pp. 118ff. for distinction between interest in directed and undirected thinking.

sive in nature. In situations beyond control, the expression of such interest is clearly impossible. It is resisted by the actual conditions that exist or, in a word, by reality. From this dilemma there are two means of escape; either the resistance may be overcome by such modification of interest as will bear social expression and hence conform to reality, or the resistance is not overcome. The anti-social interest persists in the unconscious at variance with reality, and conduct is out of alignment. Such forgotten "repressed" interest is thus a source of mental unrest which seeks comfort in the false assumption that its ends have actually been realized. The unsuccessful portrait painter, for instance, persuades himself that he has achieved a master piece,—by way of compensation for his failure. These phenomena of resistance and of compensation need to be considered in slightly greater detail as affecting habitual expression of interest.

The fact has been emphasized that the experience of resistance overcome is the occasion for all learning.[1] Opposition to ideas taken-for-granted means the thwarting of an expectation upon which interest depends, hence the mind is temporarily at sea. The error requires a return to the familiar from which a later excursion into the unknown may profit by the earlier experience. By this means the child arrives at certain distinctions fundamental to the concept of reality. The first experience of resistance to physical effort teaches the distinction between self and world and forms perceptions of various objects. Resistance to these perceptions and thoughts of objects teaches the distinction between experience and reality and gives conceptions of general truth. A much later form of resistance that violates these conceptions may be supposed to yield the intellectual discipline which anticipates failure by previous reflection. By this evolution from lower to higher forms, resistance when successfully over-come is the means of continually closer contact with reality and of the normally distributed interest this contact implies. The many recent applications of this principle to education in particular fields, of which Helen Marot's *The Creative Impulse in Industry* is typical, deserve study in this connection.

The degree of repression, *i.e.* of failure to overcome such resistance, depends upon the extent to which personal interests are in conflict with or dissociated from group interests. There are various causes for such dissociation.[2] Perhaps the first to appear is the resistance of

[1] W. Mitchell, *op. cit.*, p. 64.

[2] As distinguished by O. Pfister, "Psychoanalytic Method," Chap. V.

external conditions, which may be of such nature as either to prevent the continuance of an instinctive activity or to prevent its performance when required by further development. Such instances as the art lover's removal to a city without galleries, the financier's loss of capital by a turn in the market, and the scholar's loss of manuscript may illustrate repressions in each type of interest resulting from the former cause. The latter is illustrated by the younger boy's reluctance to enter games with his elders. As distinct from these external factors, repression may result from the moral interest or loyalty, which denies expression to legitimate interests from a mistaken sense of propriety. An example may be found in the group prejudice against the "grind" which opposes his practical interest to excel in school work. The resulting conflict between loyalty to the group and obedience to authority can normally have but one outcome,—the group triumphs. This distaste for authority as such is characteristic of all aggressive interest; hence the value of problem methods which avoid emphasis of the pupils' inferiority. In contrast to this preventive aspect, moral interest becomes a repressing factor in its punishing aspect. A conflict takes place between the unsocial interest expressed in the act and the inhibited social interest. The resulting psychic disturbance may lead either to another act of expiation or to repressing the fact of the misdemeanor. The pretense of virtue as a cloak to irregular conduct is thus the direct result of the guilt, since both thought and appearance of it are repressed:—witness Lady Macbeth, the proverbial instance of unconscious justification.

In "compensation" we have to consider a universal tendency of mind to disguise failures in adjustment to reality whether these result from the above typical causes or from others. Essentially the theory involved agrees with the metaphysics of Emerson's classic essay, yet it is entirely distinct from the "theory of compensation" as known to quantitative psychology. The latter in effect maintains that marked superiority in certain lines of achievement is usually offset by inferiority in others—a fallacy revealed by Thorndike.[1] As here used the term refers strictly to relative differences. Its nature appears in the universal tendency to exaggerate slightly one's income, social status, abilities, and other interests imperfectly realized. Such compensatory illusions, commonly known as "fantasy," have both favorable and unfavorable effects upon behavior. In childhood the fantasy is largely protective. The more sensitive the mind, the greater is

[1] *op. cit.*, p. 301.

the need for illusion to reduce the shock of reality. While in maturity this function sometimes serves the same purpose, as in reducing the shock of a sudden loss which otherwise might cause insanity,—its effects are usually undesirable. These effects are commonly described in the extreme forms of introversion and extroversion,[1] the former indicating an undercompensated type of behavior in which fantasy is not active enough, and the latter an overcompensated type in which the fantasy is too active.[2] The nature and extent of such fantasy are best determined when consciousness is unfocussed—whether by sleep, fatigue, drugs, or other agencies.[3] Introversion then implies a preoccupation with self which renders adaptation most difficult. "Interest persistently turns inwards, away from the contact of the world, and finds its easiest and most natural utilization in thought." Fear plays an important part in its impulses which tend toward self criticism and against emotional betrayal. The extrovert on the contrary accepts social interests spontaneously and without question. His life is largely superficial, but gains in breadth what it lacks in depth. It reveals a maximum of vigorous and impulsive feeling with a minimum of thought and reflection.

Between these widely opposed extremes the degrees of compensation are normally distributed, as indicated in Figure Two. From this it will be inferred that when equal in degree the combined effects of self-interest and social interest are most to be desired, as implying the successful but effortful over-coming of resistance which is the condition of fullest development. Hence abnormality in expression of habitual interest, leading to dementia praecox in the one case and to paranoia in the other, is seen to result when either adaptive social interest or aggresive self-interest becomes overbalanced. By reference to the types of social interest (see pp. 450) it will be noted that social interest for the introvert consists in preoccupation with his duties to society. External resistance is largely successful aud his interest lies habitually in thought of situations to be met. It is therefore intrinsic and finds expression in the aesthetic, moral, and theoretical elements of this type. Moral issues are very significant, whatever

[1] White, *op. cit.*, pp. 217ff. compares these terms with numerous other equivalents.

[2] For helpful illustrations from school situations see Long: Psychoanalysis in Relation to the Child. *Journal of Experimental Pedagogy* (London), June, 1917.

[3] Most advantageously perhaps by day dreams, *cf.* J. Adams, *ibid*, March, 1914 and Thorndike, *Educ. Psych.* (1910) p. 50; and occasionally by choice of reading; Hall, *Ped. Sem.*, 9:99 and Bell and Sweet, *Journal of Educ. Psych.*, 7:39–45.

standards may be, and social adjustment is achieved by force of intellectual grasp. On account of this self-critical tendency, a recognized deficiency in performance is likely to be overcome by persistent effort, after the manner of the poor student who becomes the successful teacher. The many exceptions to this course quite naturally result from the relative infrequency of this intrinsic social interest in its

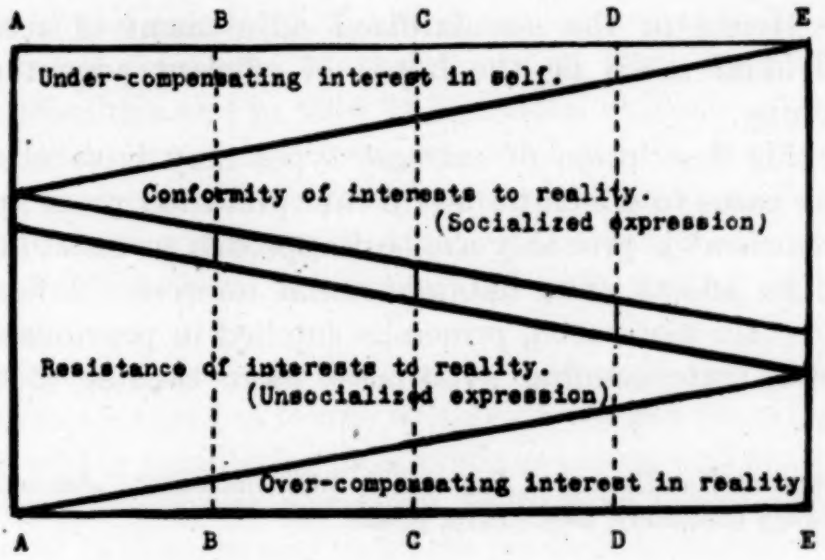

Figure Two. **Illustrating the Socializing Effect of Resistance upon Aggressive Interest.**

Explanation:

A,B,C,D,E indicate degrees of resistance as normally distributed.
A indicates stage of maximum resistance to aggressive interests. Failure to realize is largely compensated by fantasy of success.
B indicates stage of normal introversion. Resistance to aggressive interests is partially overcome by conscious effort.
C indicates the ideal mean between intrinsic and extrinsic interests about which compensation centers.
D indicates stage of normal extroversion. Easy conformity to social interests only slightly compensated by fantasy and largely confirmed by actual success.
E indicates stage of minimum resistance to aggressive interests implying successful adaptation by which these interests are confirmed.

pure expression. For the extrovert, the effect of whose experience and mental disposition is such as largely to negate resistance, expression occurs in the extrinsic elements,—the purely practical and the rational. The ease of adjustment renders each situation primarily the means for continued instinctive expression. Hence moral issues are unlikely to arise and when they do they are decided by the standards of the moment. While the resulting inconsistency is opposed to social integration, such behavior illustrates the teaching of "conflict psy-

chology" with respect to mental hygiene; namely, "express every painful situation in a social way." "To know the better and follow the worse indicates a healthier state of mind . . . than that possessed by the individual whose ill-doing springs from repressed unconscious motives."[1] Yet in all behavior a purposeful overcoming of resistance is the best means of compromise between intrinsic and extrinsic social interest on which capacity for both moral and rational conduct depends. Hence in the standardized adjustment of resistance to meet individual needs lie the hopes of efficient education and of psychotherapy.

While this description of extreme types may have obscured the intervening cases to which its useful interpretation must apply, such plan of treatment is probably the best approach to the study of resistance and its effects upon habitual social interest. A final chapter indicates certain motivating principles implied in previous discussion and suggests corresponding hypotheses more capable of conclusive experiment.

[1] *cf.* Lawrence, The Theory of Repression and Character. *Journal of Experimental Pedagogy* (London), Dec., 1916, p. 62.

LANGUAGE ABILITIES AND THEIR RELATIONS TO COLLEGE MARKS

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In view of the assertions of college teachers that college students of foreign born parentage are hampered in their work because of language difficulties and in view of statistical evidence that language difficulties are in some measure accountable for the lower marks and the greater amount of retardation among children of foreign born parents than among children of American parentage, the relations of language abilities has become a subject worthy of thorough investigation.

The present study is an attempt to determine the inter-relations of the abilities involved in theme writing, in reading for understanding of content, and in completing mutilated sentences, and the relations of each of these abilities or groups of abilities to marks received in a college course in rhetoric and to marks received in whatever academic courses had been taken by these students in the sophomore year of their college course.

The group of subjects consisted of ninety-eight sophomore students, eighty-six women and twelve men, registered in classes in general psychology in the College of Science, Literature and the Arts at the University of Minnesota. Since all had re-entered the University as sophomore students they may be considered a somewhat more highly selected and homogeneous group than the freshman class.

Of the marks made in the rhetoric course during the two semesters of the freshman year, ten were A's, fifty-two were B's, one-hundred were C's, twenty-nine were D's, and five were failures. In order to reduce the marks made in freshman rhetoric and also those made in the academic courses taken in the sophomore year to numerical values, the A's were given a value of 95, the B's a value of 85, the C's a value of 75, the D's a value of 65, and F's a value of 45.

The group of ninety-eight students was given two half hour periods in which to write two themes, one on the topic, "How I Earned Some Money" and the other on the topic "My One Extravagance." Each of the themes was rated for general merit by three college teachers of rhetoric with the use of the Thorndike Extension of the Hillegas Scale for Measuring English Composition. The final value assigned

to each theme was the median rating or the middle one of the three ratings assigned by the three teachers of rhetoric.

At the same time that the composition tests were given, two of the Trabue language completion scales—L and M—were also given, five minutes being allowed for each scale. Wherever the individual who scored the language completion scales felt at all uncertain about the value of a response a second person was consulted and the final score agreed upon by the two judges in consultation.

At other periods two reading tests requiring about fifty minutes each were given to the same group. The reading tests used were those devised by Professor J. M. Thomas and Professor M. E. Haggerty of the University of Minnesota. Each test consisted of six paragraphs with five questions of somewhat equal difficulty bearing on each paragraph. These tests had been worked out on the same basis as the Understanding of Sentences Test, Alpha II, by Professor E. L. Thorndike. The values extended from 9.3 P. E. to 11.0 P. E. By deducting 1.0 P. E. from the paragraph value in case the student missed more than two of the five questions in the easiest task, and adding 1.0 P. E. to the paragraph value in case the student answered correctly all five of the questions bearing upon the most difficult paragraph, the range was extended to from 8.3 P. E. to 12.0 P. E., a distance approximately equivalent to that between the median achievement of the fifth grade and the median achievement of the fourth year of high school, and wide enough to include all in this group. Each reading test was scored by three college teachers of rhetoric and the median score for each paragraph was taken as the basis of estimating the achievement of the student. The final grade in each reading test consisted of the average of the achievements in each paragraph. The plan used for calculating the degree of achievement was that worked out by Professor E. L. Thorndike and published in the Teachers' College Record for November, 1915. In case, however, a student failed to answer correctly more than two of the five questions in any paragraph 1.0 P. E. was subtracted from the paragraph value, while in case a student answered all the questions bearing on any paragraph correctly, 1.0 P. E. was added to the paragraph value. The first value would be included in the average only in case it lowered it, and the latter value would be included in the average only in case it raised it.

The following table giving the median score and the range of scores or marks in each of the tests indicates the distribution of the groups in the several tests.

TABLE I

Median score and range of scores in theme qualities, reading tests, and Trabue language completion tests for the ninety-eight sophomore students.

Test	Score Median	Range Quartile	Range Total
Theme "How I earned some money" (A)..	70	68–75	50–84
Theme "My one extravagance" (B)..	73	69–77	50–85
Reading Test IA.....	9.1	8.9–9.4	8.3–10.4
Reading Test IA.....	9.1	8.9–9.4	8.3–10.4
Trabue language completion scale L.....	9	7–11	0–15
Trabue language completion scale M.....	11	10–13	3–16

In order to determine the reliability of each test and of the marks for each semester the correlations between each pair of similar tests and each pair of marks were determined. These coefficients of reliability are given in Table II.

TABLE II

Correlations between each two similar tests or each two similar sets of marks.

Sophomore marks, first semester, and sophomore marks second semester.....	$r = +.55 \pm .07$
Rhetoric marks, first semester, and rhetoric marks second semester.....	$r = +.68 \pm .054$
Reading test I scores and reading test IA scores.....	$r = +.40 \pm .084$
Qualities of theme "How I earned some money" and qualities of theme "My one extravagance".....	$r = +.49 \pm .076$
Trabue language completion scale L scores and Trabue language completion scale M scores.....	$r = +.44 \pm .081$

In Table III are given the coefficients of correlation between the scores of each test or set of marks and the scores of each of the other tests or sets of marks, together with the averages of each four corresponding coefficients and the probable error of the average coefficients.

TABLE III

Correlations between each test or set of marks and each other test or set of marks, and the averages of the four coefficients.

Sophomore marks, 1st semester, and rhetoric marks, 1st semester.....	$r = +.41$
Sophomore marks, 1st semester, and rhetoric marks, 2d semester.....	$r = +.53$
Sophomore marks, 2d semester, and rhetoric marks, 1st semester.....	$r = +.34$

TABLE III.—*Continued*

Sophomore marks, 2d semester, and rhetoric marks, 2d semester	r = + .42
Average of the four coefficients between sophomore marks and rhetoric marks for one semester	r = + .42 ± .023
Sophomore marks, 1st semester, and reading test 1 scores	r = + .26
Sophomore marks, 1st semester, and reading test 1A scores	r = + .22
Sophomore marks, 2d semester, and reading test 1 scores	r = + .29
Sophomore marks, 2d semester, and reading test 1A scores	r = + .30
Average of the four coefficients between sophomore marks for one semester and a reading test	r = + .267 ± .01
Sophomore marks, 1st semester, and theme A qualities	r = + .31
Sophomore marks, 1st semester, and theme B qualities	r = + .27
Sophomore marks, 2d semester, and theme A qualities	r = + .32
Sophomore marks, 2d semester, and theme B qualities	r = + .43
Average of the four coefficients between sophomore marks for one semester and a theme	r = + .333 ± .02
Sophomore marks, 1st semester, and completion scale L scores	r = + .30
Sophomore marks, 1st semester, and completion scale M scores	r = + .21
Sophomore marks, 2d semester, and completion scale L scores.	r = + .15
Sophomore marks, 2d semester, and completion scale M scores	r = + .35
Average of the four coefficients between sophomore marks for one semester and one completion scale	r = + .252 ± .026
Rhetoric marks, 1st semester, and reading test I scores	r = + .16
Rhetoric marks, 1st semester, and reading test IA scores	r = + .19
Rhetoric marks, 2d semester, and reading test I scores	r = + .26
Rhetoric marks, 2d semester, and reading test IA scores	r = + .18
Average of the four coefficients between rhetoric marks for one semester and a reading test	r = + .197 ± .012
Rhetoric marks, 1st semester, and theme A qualities	r = + .45
Rhetoric marks, 1st semester, and theme B qualities	r = + .42
Rhetoric marks, 2d semester, and theme A qualities	r = + .41
Rhetoric marks, 2d semester, and theme B qualities	r = + .39
Average of the four coefficients between rhetoric marks for one semester and a theme	r = + .417 ± .007
Rhetoric marks, 1st semester, and completion scale L scores.	r = + .35
Rhetoric marks, 2d semester, and completion scale L scores	r = + .40
Rhetoric marks, 2d semester, and completion scale M scores	r = + .45
Average of the four coefficients between rhetoric marks for one semester and one completion scale	r = + .380 ± .017
Reading test I scores and theme A qualities	r = + .14
Reading test I scores and theme B qualities	r = + .21
Reading test IA scores and theme A qualities	r = + .26
Reading test IA scores and theme B qualities	r = + .08
Average of the four coefficients between a reading test and a theme	r = + .172 ± .023
Reading test I scores and completion scale L scores	r = + .15
Reading test I scores and completion scale M scores	r = + .19

TABLE III.—*Continued*

Reading test IA scores and completion scale L scores	r = +.15
Reading test IA scores and completion scale M scores.....	r = +.24
Average of the four coefficients between a reading test and a completion scale.....	r = +.182 ± .012
Theme A qualities and completion scale L scores.....	r = +.34
Theme A qualities and completion scale M scores.....	r = +.30
Theme B qualities and completion scale L scores.....	r = +.54
Theme B qualities and completion scale M scores.....	r = +.25
Average of the four coefficients between a theme and a completion scale.....	r = +.357 ± .03

While the probable errors of these correlations are all very small, the coefficients themselves are relatively low. This may be accounted for in part by the close homogeneity of the group of students, all of whom had successfully passed the work of the freshman year. In order to show the effect of increasing the reliability of the tests and of the marks used, the correlations were also found when the scores of each pair of tests were combined into a single set of scores. These coefficients are given in table IV.

TABLE IV

Correlations between tests and marks when either one or both pairs of similar scores or marks are combined.

Sophomore marks, both semesters, and rhetoric marks, both semesters.	r = +.40
Sophomore marks, both semesters, and scores in reading tests I and IA.	r = +.35
Sophomore marks, both semesters, and scores in themes A and B.....	r = +.37
Sophomore marks, both semesters, and scores in Trabue language completion tests L and M.....	r = +.31
Rhetoric marks, both semesters, and scores in reading tests I and IA....	r = +.35
Rhetoric marks, both semesters, and scores in themes A and B.....	r = +.57
Rhetoric marks, both semesters, and scores in Trabue language completion tests L and M.....	r = +.53
Scores in reading tests I and IA and scores in themes A and B.....	r = +.26
Scores in reading tests I and IA and scores in Trabue language completion tests L and M.....	r = +.25
Scores in themes A and B and scores in Trabue language completion tests L and M.....	r = +.44
Sophomore marks, 1st semester, and scores in reading tests I and IA...	r = +.31
Sophomore marks, 2d semester, and scores in reading tests I and IA....	r = +.42
Sophomore marks, both semesters, and scores in reading test I.....	r = +.31
Sophomore marks, both semesters, and scores in reading test IA.....	r = +.31
Sophomore marks, 1st semester, and scores in themes A and B.....	r = +.33
Sophomore marks, 2d semester, and scores in themes A and B.....	r = +.40
Sophomore marks, both semesters, and scores in theme A.....	r = +.31

TABLE IV.—*Continued*

Sophomore marks, both semesters, and scores in theme B	r = +.34
Sophomore marks, 1st semester, and scores in Trabue language completion tests L and M	r = +.28
Sophomore marks, 2d semester, and scores in Trabue language completion tests L and M	r = +.28
Sophomore marks, both semesters, and scores in Trabue language completion test L	r = +.28
Sophomore marks, both semesters, and scores in Trabue language completion test M	r = +.23
Rhetoric marks, 1st semester, and scores in reading tests I and IA	r = +.25
Rhetoric marks, 2d semester, and scores in reading tests I and IA	r = +.28
Rhetoric marks, both semesters, and scores in reading test I	r = +.27
Rhetoric marks, both semesters, and scores in reading test IA	r = +.25
Rhetoric marks, 1st semester, and scores in themes A and B	r = +.52
Rhetoric marks, 2d semester, and scores in themes A and B	r = +.53
Rhetoric marks, both semesters, and scores in theme A	r = +.53
Rhetoric marks, both semesters, and scores in theme B	r = +.45
Rhetoric marks, 1st semester, and scores in Trabue language completion tests L and M	r = +.40
Rhetoric marks, 2d semester, and scores in Trabue language completion tests L and M	r = +.47
Rhetoric marks, both semesters, and scores in Trabue language completion test L	r = +.41
Rhetoric marks, both semesters, and scores in Trabue language completion test M	r = +.44

It will be noticed at once that increasing the reliability of the tests tends to raise the correlations, also that increasing the number of the academic marks used has about the same effect upon increasing the size of the correlations. There can be no doubt that improving the tests will still further enhance the relationships. The unreliability of the marks as measures of achievement, however, plays just as important a role in keeping the correlations low. To eliminate this tendency as far as possible the raw coefficients of table IV have been corrected for attenuation by the formula:

$$r_{pq} \frac{\sqrt{r_{p_1q_2} \times r_{p_2q_1}}}{\sqrt{r_{p_1q_2} \times r_{p_2q_1}}}$$

In order to get a somewhat more accurate measure of the relationship between the rhetoric marks and the sophomore academic marks than would otherwise be possible, the same formula for making correction for attenuation was applied, even though the pairs of marks are not, strictly speaking, independent measures of the same

abilities. Two possible sources of error are of course present: the validity of the formula for making the correction for attenuation has been questioned by some competent authorities, and the pairs of marks can hardly be strictly accepted as two independent measures of the same abilities. These corrected coefficients are given in table V. Though they may be far from accurate they undoubtedly give a truer account of the relationships than do the raw coefficients.

TABLE V

Coefficients of correlation between abilities involved in making scores in the tests and abilities involved in making marks. Raw coefficients between scores in tests and marks corrected for attenuation.

Abilities to do Trabue language completion tests and abilities to write English compositions	r = +.869
Abilities to make rhetoric marks and abilities to write English compositions	r = +.719
Abilities to make rhetoric marks and abilities to make sophomore marks	r = +.688
Abilities to make rhetoric marks and abilities to do Trabue language completion tests	r = +.685
Abilities to make sophomore marks and abilities to write English compositions	r = +.557
Abilities to make sophomore marks and abilities to do reading tests	r = +.532
Abilities to write English compositions and abilities to do reading tests	r = +.522
Abilities to make rhetoric marks and abilities to do reading tests	r = +.423
Abilities to do Trabue language completion tests and abilities to do reading tests	r = +.404
Abilities to do Trabue language completion tests and abilities to make sophomore grades	r = +.430

Evidently the ability to make rhetoric marks has a closer relation to ability to make sophomore marks than has the ability to write English composition. This may not be assumed, however, to indicate that rhetoric marks are the better basis for predicting sophomore achievement, but may indicate rather that the same irrelevant factors that account for the lack of a high relation between rhetoric marks and composition ability account also for the fact that the relation between the ability to make rhetoric marks and the ability to make sophomore marks is higher than the relation between the ability to write English composition and the ability to make sophomore marks. The possible effect of such irrelevant factors as personal appearance, neatness of work, tactfulness, sociability, good manners, an attractive personality, and even a pleasing voice can work only to lessen the relation between the ability to make marks and the ability to achieve

results. To the extent that such factors do lower this relation they also lower the actual relation that exists between the ability to do certain tests, such as the sentence completion scales or the reading tests, and the ability is measured in terms of academic marks. This suggests that sufficiently reliable measures of language abilities may be considerably better indications of abilities to achieve results in academic subjects than the correlations in the above tables indicate.

It may be somewhat surprising that the ability to do the reading tests has no closer a relation to the ability to make rhetoric marks than is expressed by the Pearsonian coefficient of +.42. The very low correlations between the rhetoric marks for either semester and the scores in either reading test are undoubtedly due in part to the unreliability of the rhetoric marks and of the reading tests, as is indicated by the higher correlations when the numbers of the marks and scores of the tests are doubled. The reliability of the reading tests can be readily increased, of course, by improving and lengthening the tests themselves. The low correlation between the abilities, however, is more likely to be due to the fact that mechanical perfection rather than the thought content quality of the theme writing is given the greater weight in the assigning of the rhetoric marks. The higher correlation between the ability to write English composition and the ability to do the reading tests tends to confirm this supposition. Although the relation between the ability to write English composition and the ability to do the reading tests is somewhat higher; namely, +.52, yet the relationship is not a close one. The lack of a closer relationship may undoubtedly be accounted for to no small extent by the fact that both abilities are largely influenced by the quality of previous teaching and that largely as a matter of chance would the student who had been wisely taught to read also have been efficiently taught to write English composition, since they are taught not only by different teachers but at different ages and in different types of schools.

In table VI are given the averages of the four coefficients for each two tests and also the correlations between the same two tests when whatever is common to them and to a third test or to a third and a fourth test is eliminated or kept constant. Thus, the relation between the reading test scores for understanding of content and the sophomore marks for one semester is +.267, but with whatever is common to these and also to the qualities of English composition eliminated from the relationship, it becomes +.194. With whatever is com-

TABLE VI

The averages of the four coefficients for each relation as given in table III and the partial coefficients when a third or a third and a fourth factor are kept constant.

Reading test scores and sophomore marks for one semester	r = +.267
With what is common to these and a theme kept constant	r = +.194
With what is common to these and a completion test kept constant	r = +.232
With what is common to these and a theme and a completion test kept constant	r = +.177
Reading test scores and rhetoric marks for one semester	r = +.197
With what is common to these and a theme kept constant	r = +.140
With what is common to these and a completion test kept constant	r = +.140
With what is common to these and a theme and a completion test kept constant	r = +.108
Theme scores and sophomore marks for one semester	r = +.333
With what is common to these and a reading test kept constant	r = +.302
With what is common to these and a completion test kept constant	r = +.269
With what is common to these and a reading test and a completion test kept constant	r = +.250
Theme scores and rhetoric marks for one semester	r = +.417
With what is common to these and a reading test kept constant	r = +.376
With what is common to these and a completion test kept constant	r = +.326
With what is common to these and a reading test and a completion test kept constant	r = +.291
Completion test scores and sophomore marks for one semester	r = +.252
With what is common to these and a reading test kept constant	r = +.215
With what is common to these and a theme kept constant	r = +.151
With what is common to these and reading test and a theme kept constant	r = +.127
Completion test scores and rhetoric marks for one semester	r = +.380
With what is common to these and a reading test kept constant	r = +.357
With what is common to these and reading test and a theme kept constant	r = +.240
Reading test scores and theme scores	r = +.172
With what is common to these and the completion test kept constant	r = +.116
Reading test scores and completion test scores	r = +.182
With what is common to these and a theme kept constant	r = +.131
Completion test scores and theme scores	r = +.357
With what is common to these and a reading test kept constant	r = +.336

mon to the reading test scores and the sophomore marks for one semester and also common to the scores of a completion test eliminated, the relationship becomes +.232 instead of +.267. This, of course, means that while both the reading test scores and the quality of the written compositions are related to the sophomore marks, the latter by +.333, the overlapping is very small indeed. At the same time the relation between the composition qualities and the sophomore

marks is very slightly lowered when whatever is common to these and to the reading test scores is eliminated from the relationship existing between them. This is just what one would expect from the previous tables.

In case whatever is common to the Trabue language completion scales and also common to the reading test and to the sophomore marks is eliminated, the relation between the reading test scores and the sophomore marks is likewise slightly affected. On the other hand, the relation between the written composition and the sophomore marks—+.333—drops to +.269 when whatever is common to these and also the Trabue language completion scale is eliminated. When whatever is common to the Trabue language completion scale and the sophomore marks and also to the written composition is eliminated, the relationship between the Trabue language completion scale and sophomore marks drops from +.252 to +.151.

The six coefficients at the bottom of table VI indicate that elimination of the Trabue language completion scale factor lowers the relationship between the reading test scores and English composition ratings for general merit to a small extent, and the elimination of the English composition element lowers the relationship between the reading test scores and the Trabue language completion test scores likewise to a small extent. The elimination of the reading test element from the relationship of the Trabue language completion test scores and the English composition ratings for general merit lowers the relation hardly at all. When the tests and numbers of marks are doubled the coefficients become higher than for the single tests but the comparative relationships remain unchanged. The last six coefficients of table VII, which give the partial coefficients when the correlations among the abilities are used, show the same tendencies as the last six coefficients of table VI. Evidently, then, it is not what these tests or these abilities have in common that accounts for their relations to sophomore marks or the abilities to make sophomore marks. On the other hand, it is what the theme writing and the sentence completion tests do have in common that largely accounts for their relation to the rhetoric marks; also it is what their abilities have in common that accounts for the relations of these abilities to the ability to make rhetoric marks. As was previously pointed out, however, there are two possible sources of error in the derivation of the coefficients corrected for attenuation yet the corrected coefficient and the partial coefficients derived from them undoubtedly give a much

more accurate notion of the relationships among the abilities involved in the tests and college marks than do the raw coefficients showing relationships between each pair of tests when the correlations between similar tests or similar sets of marks rise above +.60 in only one case out of the five.

From the facts of table VI it is evident that compositions taking not more than half an hour to write, and graded with the Thorndike Extension of the Hillegas Scale by three competent people have just as close a relation to the sophomore marks as do the reading tests for understanding of content taking somewhat longer to give. This probably indicates that the student is judged by the quality of his written work in examinations and in term papers to as great a degree as by his ability to comprehend what he reads. The corrections for attenuation in table VII tend to bear this out. This does not prove, however, that the composition ability is more closely related to ability to make academic marks than is the ability to do the reading tests—table V shows that the two abilities have approximately the same relation to the ability to make sophomore marks—nor does it prove that the ability to read is any less closely related to the ability to achieve results in academic subjects. The facts, however, that the relationship between the composition test and the sophomore marks is disturbed but little by eliminating what is common to these and to the reading test, and that the relationship between the reading test and the sophomore marks is likewise affected only to a small extent by keeping constant whatever is common to these and to the composition test, indicate very clearly that a reading test, and a composition test, or a sentence completion test may well be included in any college entrance examination or in any test designed to classify college students. The partial coefficients given in table VII substantiate the advisability of doing this.

In regard to the work in English three further observations seem warranted by the evidence presented in the above tables: first, for classification students in rhetoric, either a composition test or an extensive sentence completion test seems to offer a reasonable basis; second, for classifying students in classes for the study of literature the reading test may undoubtedly be expected to give a considerably better basis than either the composition test or the sentence completion test; third, in view of the differences in the abilities involved in reading for thought content and in writing ac-

ceptable composition, it seems highly inadvisable to give a single mark for both subjects, calling it a mark in English, as is the common practice in secondary schools.

The results given in table VII substantiate the inferences drawn from the facts of table VI. The abilities involved in composition

TABLE VII

Correlations and partial correlations among abilities involved in the language tests and college marks. Raw coefficients corrected for attenuation.

Reading abilities and abilities involved in making sophomore marks	$r = +.532$
With what is common to these and composition abilities kept constant	$r = +.338$
With what is common to these and completion test abilities kept constant	$r = +.462$
Reading abilities and abilities involved in making rhetoric marks	$r = +.423$
With what is common to these and composition abilities kept constant	$r = +.080$
With what is common to these and completion test abilities kept constant	$r = +.219$
Composition abilities and abilities involved in making sophomore marks	$r = +.557$
With what is common to these and reading abilities kept constant	$r = +.383$
With what is common to these and completion test abilities kept constant	$r = +.563$
Composition abilities and abilities involved in making rhetoric marks	$r = +.719$
With what is common to these and reading abilities kept constant	$r = +.640$
With what is common to these and completion tests abilities kept constant	$r = +.344$
Completion test abilities and abilities involved in making sophomore marks	$r = +.340$
With what is common to these and composition abilities kept constant	$r = +.350$
With what is common to these and reading abilities kept constant	$r = +.161$
Completion test abilities and abilities involved in making rhetoric marks	$r = +.685$
With what is common to these and composition abilities kept constant	$r = +.685$
With what is common to these and reading abilities kept constant	$r = +.620$
Reading abilities and composition abilities	$r = +.522$
With what is common to these and completion test abilities kept constant	$r = +.377$
Completion test abilities and composition abilities	$r = +.869$
With what is common to these and reading abilities kept constant	$r = +.869$
Completion test abilities and reading abilities	$r = +.404$
With what is common to these and composition abilities kept constant	$r = +.117$

writing account in part for the relation—+.53—between the abilities involved in making sophomore marks and those involved in reading for content. At the same time the abilities involved in composition writing account very largely for the relation—+ .42—between the abilities involved in making freshman rhetoric marks and those involved in reading for content. The reading test, then, has a distinct relation to college marks in general apart from either the student's ability to write compositions or to fill in the blanks in a completion test. On the other hand, it seems to have a less close relation to the abilities involved in the study of rhetoric insofar as that study functions in improved ability to write compositions. This conclusion is further substantiated by the correlations showing that the abilities involved in reading have but little in common with the abilities involved in composition writing and those involved in making marks in rhetoric. They reduce the correlation only from +.719 to +.64. Furthermore, the relation between the abilities involved in making rhetoric marks and those involved in filling in the blanks in a completion test is reduced only from + .685 to + .62 when the abilities involved in reading for content are eliminated from the relationship. Such a condition presupposes a very close relation between the abilities involved in filling in the blanks in a completion test and those involved in composition writing and also that this relationship should be accountable for only to a small degree by the abilities common to these and also to reading for content. That this is exactly the condition is indicated by the correlation between the abilities involved in composition writing and those involved in filling in completion test blanks—a correlation which is reduced from +.869 only to +.837 when whatever is common to these abilities and also to the abilities involved in reading for content is eliminated.

In table VIII are given the raw coefficients, and also the partial coefficients when certain factors are kept constant, between the rhetoric marks for one semester of the freshman year and the sophomore academic marks for one semester, and also between the averages of the rhetoric marks for the two semesters and the sophomore academic marks for the two semesters.

The striking fact about this table is not the comparatively low correlations between the rhetoric marks and the sophomore marks for one semester or for two semesters, even though one would expect them to be somewhat higher, inasmuch as the sophomore marks are

TABLE VIII

Relations of rhetoric marks to sophomore academic marks.

Rhetoric marks, one semester, and sophomore marks, one semester	r = +.425
With what is common to these and the composition test kept constant	r = +.333
With what is common to these and the reading test kept constant	r = +.395
With what is common to these and the Trabue language completion test kept constant	r = +.368
With what is common to these and the composition test and the reading test kept constant	r = +.319
With what is common to these and the composition test, the reading test, and the Trabue language completion test kept constant	r = +.300
Rhetoric marks, two semesters, and sophomore marks, two semesters	r = +.400
With what is common to these and the composition tests kept constant	r = +.249
With what is common to these and the reading tests kept constant	r = +.325
With what is common to these and the Trabue language completion tests kept constant	r = +.296
With what is common to these and the composition tests and the reading tests kept constant	r = +.200
With what is common to these and the composition tests, the reading tests, and the Trabue language completion tests kept constant	r = +.170

in no small measure based upon the composition ability of the students, but the small amount by which these correlations are reduced when whatever is common to these and to the composition test, or to the reading test, or to the Trabue language completion scale, or even to all three is eliminated. That so small a proportion of the relationship between the rhetoric marks and the sophomore marks can be accounted for on the basis of the composition ability of the students and that a still smaller proportion can be accounted for on the basis of reading for thought content is truly astonishing. Surely other factors besides academic achievement must enter into the assignment of academic marks, inaccurate subjective estimations undoubtedly being one of the more important ones. Since this seems to be the case, we cannot expect any approximately exact measure of achievement in composition writing, as far as general merit is concerned, to show a high correlation with the marks made in rhetoric, nor are we likely to find any tests for making anywhere nearly as accurate a prediction as to what marks a student will make in rhetoric as we can as to what degree of achievement he has attained in ability to write English composition, or is likely to attain in it under similar conditions of tuition.

The conditions pointed out with respect to rhetoric, however, must not be understood to be characteristic of rhetoric alone. The fact that more adequate means for making more accurate measurements have been developed in this field has made possible the analysis of these conditions in this particular subject. That just as large discrepancies may be expected to exist between academic marks and academic achievements in other subjects is evidenced by the low correlation between the sophomore marks of the first semester and those of the second semester of the same year.

THE EFFECT OF RATE OF SILENT READING ON ABILITY TO RECALL

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[NOTE.—The data for this article was collected by J. M. Frost and J. A. Russell, students in a course in Experimental Education at Dartmouth College.]

The relationship of speed and comprehension in reading has received theoretical consideration by many writers. Romanes,[1] Abell,[2] and Quantz[3] have studied the relative ability of rapid and slow readers to recall what they have read. Romanes found that the most rapid readers were best in reproducing what they had read. Abell found that the same two subjects headed the list for both speed of reading and ability to recall. Quantz found that his rapid readers were on the average about 37% superior to the slow subjects in the quality of their work. The fast readers were more exact in reproduction and did not introduce so many extraneous ideas in their reports. Judd[4] and Gray[5] found about twice as many rapid readers with good quality scores as with poor scores.

But these investigators have compared one type of individual, the rapid reader, with another type of individual, the slow reader. The further problem arises as to whether an increase in the rate of reading of a particular reader will result in a loss in ability to recall what has been read; whether a reader can speed up his reading rate without lowering his capacity to reproduce what he has read. It is the purpose of this article to report a study of the effect of different speeds of silent reading upon ability to recall what has been read.

Two sets of six paragraphs each were chosen for the experiment. One set was for use with high school and college students and the other set for use with the fourth and seventh grades. The paragraphs in a set were relatively equal in difficulty but differed widely in content. Each paragraph was composed of ten distinct ideas and contained fifty words. A few paragraphs chosen from each of the two sets are given below. Each paragraph was printed on a separate card for use by the readers.

SAMPLE PARAGRAPHS FROM THE SET USED WITH THE FOURTH AND SEVENTH GRADES

1. The Amazon is the longest river in the world. It drains most of the northern half of South America. Its mouth is along the equa-

tor. The rubber tree grows in this valley and the few people that live there spend most of their time making gum.

2. Abraham Lincoln was born in Kentucky in the year eighteen hundred and nine. His father was too lazy to work and his mother had to make a living for the family. After she died Abraham had to do for himself. But he was one of those boys who made good.

3. One day a deer was feeding on top of a hill. A little fawn was with her. Its brown coat was marked by spots. Its father had gone for a trip across the hills and had not yet got back. He went to feed on the lily leaves there.

Sample Paragraphs from the Set Used with High School and College Students

4. In person William of Orange was above middle height. His eyes and complexion were brown. His head was small portraying the alertness of a soldier. He was more than anything else religious. He went through life bearing the people's sorrows upon his shoulders with a smiling face.

5. One morning a doe was feeding on Basin Mountain. Her sole companion was a little fawn whose brown coat was beginning to be mottled with beautiful spots. Its father had been on a long tramp across the mountain and had not yet returned. He went to feed on the lily pads there.

6. There are eight thousand volumes in the Imperial library at Paris. If a man were to read from dawn till dark for sixty years he would die in the first alcove. But if a man could know a few great books and read them he would become well read.

Three different speeds of reading were used by each subject, his normal rate, his maximum speed as controlled by the knowledge that he would be called upon to reproduce what he had read, and "at about half normal speed." As a rule this last speed was not actually nearly so slow as the subject was directed to read but it was definitely slower than his normal rate. As soon as a paragraph was read the subject immediately wrote down everything he could remember. The subject was told that he need not use the exact words of the text but to try to reproduce all the ideas he could remember.

In order to eliminate the effect of any difference in difficulty of the paragraphs and any effect of the order of reading the paragraphs, the subject read them in the order denoted by the following table, that

is, the first subject read paragraph no. 1 first at his normal rate; paragraph no. 2 just as rapidly as possible; paragraph no. 3 slowly; paragraph no. 4 at normal rate; paragraph no. 5 slowly and paragraph no. 6 rapidly. Subject no. 2 read paragraph no. 2 first at normal rate; paragraph no. 3 slowly; paragraph 4 rapidly; paragraph 5 at normal rate; paragraph 6 rapidly and paragraph 1 slowly. Subject no. 3 read paragraph 3 first at normal rate and the others in the order indicated.

Subject	Normal	Rapid	Slow	Rapid	Subject	Normal	Rapid	Slow	Rapid
1	1	2	3	..	5	5	6	1	
	4	..	5	6	..	2	3	..	4
2	2	..	3	4	6	6	..	1	2
	5	6	1	..	..	3	4	5	
3	3	4	5	..	7 same as 1; 8 same as 2, etc.				
	6	..	1	2	The numbers under heading Normal,				
4	4	..	5	6	Rapid, Slow, Rapid refer to paragraph				
	1	2	3	..	numbers, and indicate order of reading.				

The experiment was given to 50 college students, 25 high school students, 27 seventh grade pupils, and 23 fourth grade pupils.

As each subject read two paragraphs at his normal rate, two rapidly, and two slowly, the two reading times for each rate were added together giving the time in seconds for reading one hundred words. The sum of the number of ideas reproduced for each rate of reading gave the comprehension score for the three rates of reading for each subject.

Table I gives the average rate for normal, fast, and slow reading for each group tested. As two different sets of paragraphs were used no comparisons can be made between the rates for the fourth and seventh grades with the high school and college students.

TABLE I

Rate of reading

	Fourth	Seventh	High school	College
Slow.....	61.6	47.4	53.3	36.6
Normal.....	45.0	38.7	33.6	25.7
Fast.....	37.4	37.6	25.3	17.2

Table II gives the average comprehension scores for normal, fast, and slow reading for each grade tested.

TABLE II

Comprehension scores

	Fourth	Seventh	High school	College
Slow	8.3	11.1	10.5	10.6
Normal	8.25	10.3	8.56	10.7
Fast	9.57	11.04	8.54	9.75

In order to get some equitable basis for comparing these results, speed and accuracy were combined into a single score by dividing the comprehension score by the rate of reading expressed in seconds per hundred words. This gave the number of ideas gained per second. For example, if the subject required 30 seconds to read two paragraphs at the normal rate and reproduced 15 ideas, he gained .5 ideas per second in his reading Table III gives the ideas per second for slow, normal, and fast reading for each of the four groups of subjects.

TABLE III

Ideas gained per second

	Fourth	Seventh	High school	College
Slow	.134	.234	.195	.242
Normal	.183	.266	.251	.416
Fast	.256	.293	.329	.566

The rate, comprehension score, and the number of ideas gained per second are presented in the accompanying graphs.

In general the rate of reading, when the subjects were instructed to read very slowly was about 40 per cent slower than their normal rate. This variation in rate was fairly constant for each of the four groups of subjects. The time required for reading rapidly was about 16 per cent less than the normal reading time. This difference was fairly uniform for the different groups except for the seventh grade. The seventh grade read only a very little faster in their rapid reading than in their normal reading.

In comprehension there was very little difference for any of the groups resulting from the different rates of reading. If there was any advantage it seemed that it was in favor of the rapid reading with the children and in favor of slow reading for the older students. But in general the readers seemed to get about the same number of ideas whether they read fast, slow, or at their normal rate. This fact is shown in the accompanying graph.

When we take into consideration the time required to read the paragraphs in relation to the amount of material gained from the reading we begin to see the great advantage of rapid reading over slow or even normal reading. There were 20 per cent fewer ideas gained per second in slow reading than in reading at the normal rate and 26 per cent more ideas gained per second in rapid reading than in reading at the normal rate. This superiority of rapid reading is shown by each of the four groups of subjects tested.

Other investigators have pointed out that in general the most rapid readers of a group are best able to reproduce what they have read. Huey[6] describes a personal experiment in which he was able to increase his reading rate nearly a half during a short period of practice. While no doubt there are limits in speed beyond which we should not go, there seems little doubt but that almost any of us could materially increase our reading rate without perceptibly reducing the per cent of the ideas which we could reproduce. If this be true the teacher of reading by insistence upon accurate, rapid, silent reading would be able to reduce not only the time required by pupils in the schools in the preparation of their lessons but also and more important still greatly increase their efficiency in life.

The objection that the subject matter of this experiment was too easy might be raised. The material was easy for the seventh grade pupils and the college students but it was difficult for the fourth grade children and the high school students. The same general results were shown for all four groups. The material may not have been as difficult as advanced science, philosophy, or economics. But even with these subjects, it seems probable that slow reading is a wasteful process. Most of us could increase our rate of reading history, literature, and much descriptive science, as well as our general reading in newspapers and magazines, without loss in retaining what we have read. Another objection that the paragraphs were too brief might be raised. We cannot be sure that the same laws will hold with a paragraph containing a small number of distinct ideas and a longer

selection more or less vague in character. Furthermore delayed recall might not give as much advantage to rapid reading as immediate recall. These problems need further experimental study. But there seems to be no reason to expect the results to differ from those of the present study.

It is not our purpose to enter into a discussion of the question as to whether slow reading tends to focus the attention upon the individual words rather than upon sentence and paragraph meanings, or whether slow reading tends to be accompanied by too much gross movement of the vocal cords which acts as a distracting influence. It may be that there is a heightened muscular or nervous tonus in rapid reading which makes for greater efficiency. Suffice it to say that at least with short paragraphs of ordinary material rapid reading is decidedly more economical than either slow or normal reading.

REFERENCES

1. Romanes, "Mental Evolution in Animals," p. 136.
2. Abell, A. M. "Educational Review," October, 1894.
3. Quantz, J. O. "Psychological Review Monograph Supplements," Vol. II., No. 1 (December, 1897).
4. Judd, C. H. Measuring the Work of the Public Schools. *Cleveland Survey Monograph.*
5. Gray, W. S. "Studies of Elementary School Reading Through Standardized Tests," p. 136.
6. Huey, E. B. "Psychology and Pedagogy of Reading," p. 178.

A Correction

Through some mischance, proof of the paper in the February issue of the Journal, describing "A Brief Group Scale of Intelligence for use in School Surveys" never reached the author. As a result, certain errors appeared—errors which were for the most part unimportant, or obvious, but which should nevertheless be corrected, for the benefit of those using the scale. On the first page of the paper (p. 89), in connection with the intention there stated of using special devices for making possible "a ready interpretation of results in terms of school practice," there should have been reference to a *Communication* in the December number of the Journal, entitled "Suggestions with regard to Professor Thurstone's 'Method of Critical Scores.'" These special methods were presented in this communication, with data regarding the Cross-Out scale.

On page 97 Brown's formula was given incorrectly; the formula reads: $r_2 = \frac{2r_1}{1 + r_1}$.

On page 99 the equals and plus signs were omitted from the statement of third order partial correlation coefficients, and regression equations. The third order correlation coefficients run as follows:

$$r_{12\cdot345} = .15 \quad r_{13\cdot245} = .25 \quad r_{14\cdot235} = .28 \quad r_{15\cdot234} = .37$$

The regression equation should read:

$$x_1 = .1048x_2 + .1515x_3 + .1979r_4 + .2218x_5$$

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RECENT PUBLICATIONS

CARL EMIL SEASHORE. *The Psychology of Musical Talent.* Boston: Silver, Burdett and Company, 1919. Pp. xvi, 288. $2.40.

For over twenty years the author has been focussing the resources and methods of experimental psychology upon the problems of music. As time has gone on an increasing number of scientific monographs on the psychology of music have come from the psychological laboratory of which he is the director. This laboratory has come to be generally recognized by psychologists as the center of musical research in this country. Within the past few years the author has perfected a method for making mass studies of the musical talent of public school children, and in the present volume the results of these studies are set forth in popular, untechnical form for the benefit of the intelligent layman. In style it is a masterpiece of simple, direct exposition of a mass of material that ordinarily would be far too technical to engage the attention of the general reader. The book will undoubtedly be the classic work on the scientific measurement of musical ability for many years, and as such should be brought to the attention of every parent and teacher who is interested in musical education. The first chapter and the last indicate the mission of the book, and direct attention to the chief lines of measurement and their practical application. At the outset the author distinguishes three branches of the psychology of music: The psychology of musical talent, the psychology of art principles involved in music, and the psychology of musical training. The present volume is restricted to the first of these. Chapter one gives an analysis of the musical mind, and illustrative charts of the application of the scheme of measurement to individuals of high, mediocre and insignificant musical talent. The final chapter sketches the application of the measurement method to the training of the individual in the art. The intervening chapters are devoted to the more detailed description of the methods and instruments of measurement in each of the thirty elements of musical talent involved in the analysis. Unfortunately for students the book has no index, and only meager footnote references to the bibliography of the psychology of music.